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ABSTRACT

This text is an attempt to cover all areas in preparing deaf students to function in an in-plant printing office. Specific practice tasks are provided in all areas. The titles of the eight units are Introduction to In-Plant Printing and Cold Composition (four lessons), Paper (five lessons), Cold Composition Devices and Machines (fourteen lessons), Layout and Design (eight lessons), Stripping (four lessons), Platemaking (ten lessons), Offset Press Operation (twelve lessons), and Bindery-Finishing (five lessons). Each lesson presents a detailed description of a specific learning activity. Instructional diagrams are included. (HD)

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State of New Jersey
Department of Education
Division of Vocational Education

THE IN-PLANT PRINTER

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FOREWORD

In-Plant Printing is relatively new and fast becoming a major area of employment for deaf students. Shops are usually small; the equipment standardized from shop to shop. This text is an attempt to 'touch all bases' in preparing a student to function in this environment.

Specific practice tasks have been included in this manual in all areas. The school printshop, however, is also a production facility for the school and as such receives numerous jobs. Needless to say, these jobs must be assigned to those students most in need of the types of experiences they afford. Where jobs involving a particular skill are in short supply, the instructor should supplement the assignments given with additional practice projects.

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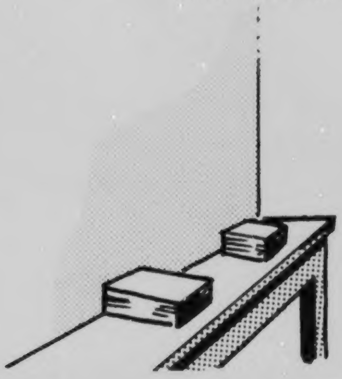
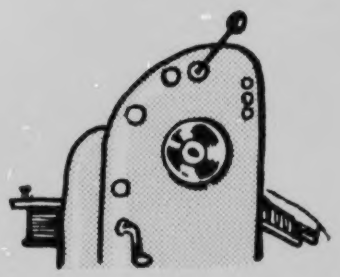
UNIT I

INTRODUCTION TO IN-PLANT PRINTING and COLD COMPOSITION

LESSON 1 – WHAT IS IN-PLANT PRINTING?

When you finish this lesson you will be able to tell someone what In-Plant Printing is all about.



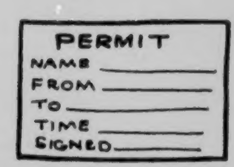


Well !!!

Now you are in the In-Plant Printing Shop

What does that mean?

It is called In-Plant Printing because it is a print shop and the shop is in a company that sells or makes something other than printed material. The company is not a printing company. It may make dishes or snowmobiles, or sell insurance or rent out cars. The company needs printed material to keep running. Think of our school here as the company. We need printed material, like PERMIT SLIPS.



PERMIT
NAME __________
FROM __________
TO __________
TIME __________
SIGNED __________

The In-Plant Print Shop prints these – but only for the use of the people here in school.

Many large companies, making things from trucks to tacks, also need printed forms, letters, reports – and they have their own print shop. An In-PLANT PRINT SHOP.

ASSIGNMENT: Fill in the blanks:

A company that makes cameras and gives the buyer instruction sheets or booklets might have an ___ ________Print Shop. Why?

LESSON 2 – WHAT DO YOU MEAN BY COLD COMPOSITION?

When you finish this lesson you will be able to tell someone what cold composition is.

Words to learn:

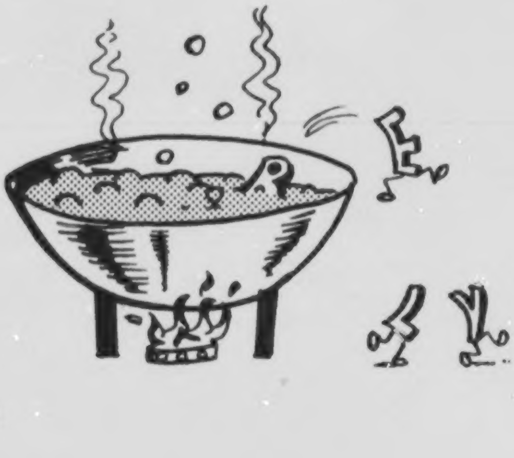
COMPOSITION (com po si′ tion) means putting letters together to make words, and words together to make sentences.

COLD COMPOSITION DOES NOT COME OUT OF THE REFRIGERATOR!!

MEATS
VEGETABLES

COLD composition just means that the letters, drawings or designs are made without using heat.

METAL TYPE, the kind that is used in letterpress printing, is made from melted lead, and is called HOT composition.



The page you are reading now was made by COLD composition. We used a typewriter and a pen. Both cold.

ASSIGNMENT: Mark TRUE or FALSE in front of the following sentences:

__________Cold composition is letters made from hot lead.

__________Hot composition is used in letterpress printing.

__________A typewriter is used in In-Plant Printing.

LESSON 3 – WHAT KINDS OF EQUIPMENT WILL WE BE USING?

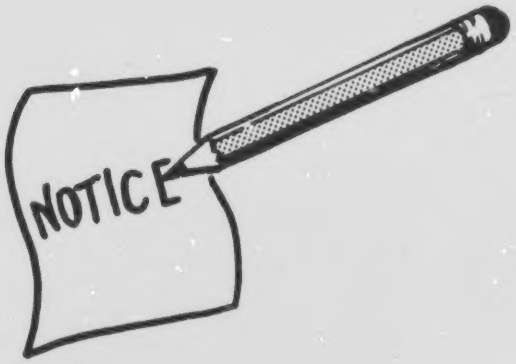
At the end of this lesson you will know the names of the machines in this shop and what they do.

Words to learn:

IMAGE – any marking on the sheet – from a pencil to a typewriter – that will be used to print a message.

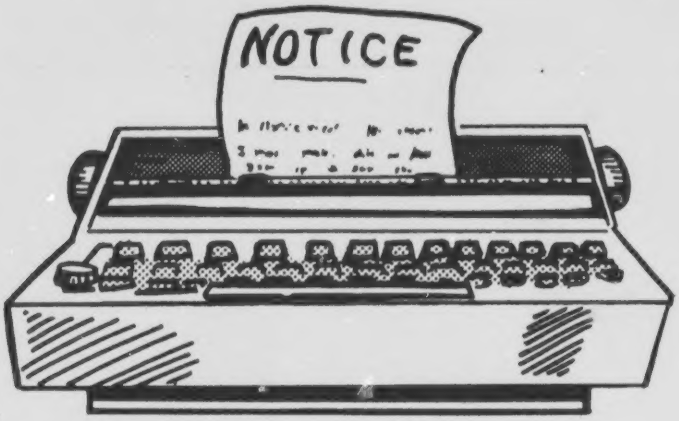
TYPEWRITER – machine used to compose (put letters together to make words, remember?) copy for printing.

The easiest tool we use will be the pencil ––



to make an IMAGE on the paper that will help show an idea, and can be printed.

Another machine we will be using is the electric TYPEWRITER––



to compose messages that would take too long to print by hand.

ASSIGNMENT: Put a circle around the word that makes the sentence correct:

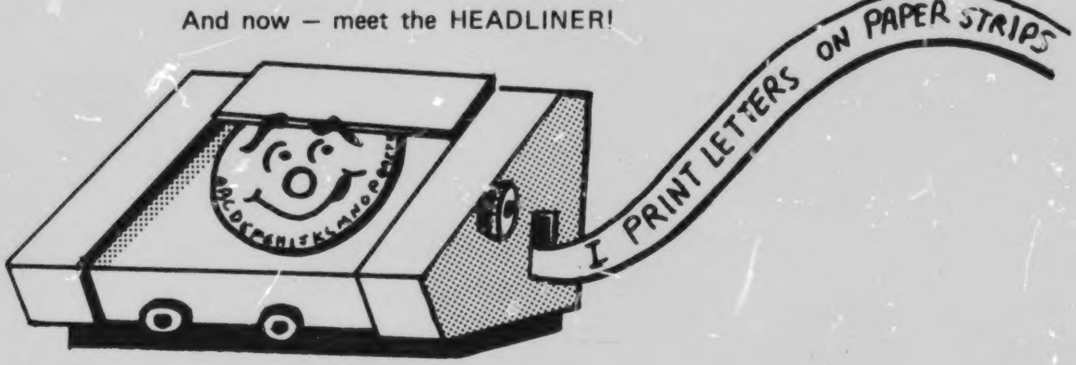
A (chisel) (pencil) (knife) (ruler) is the easiest tool to use to make an image on paper.

The (hammer) (brush) (pencil) (typewriter) is used for composition that would take too long to print by hand.

Words to learn:

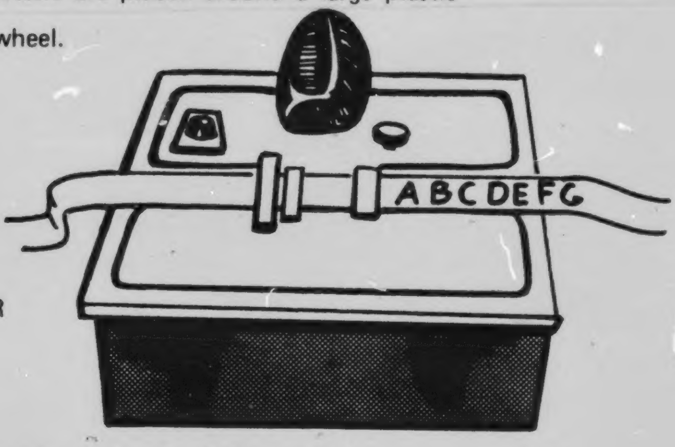
HEADLINE – the first line of a newspaper story

And now – meet the HEADLINER!


I PRINT LETTERS ON PAPER STRIPS

LARGER

The HEADLINER gives us LARGER letters than we can get from the typewriter. The letters are placed around a large plastic wheel.



And . . . the STRIPPRINTER

Letters and numbers are on a strip of film.

Composed copy stays inside until we are ready for it.

This machine does the same as the headliner – gives us larger type than a typewriter.

ASSIGNMENT (1): Fill in the blank:

Both machines make__________type than a typewriter.

Words to know:

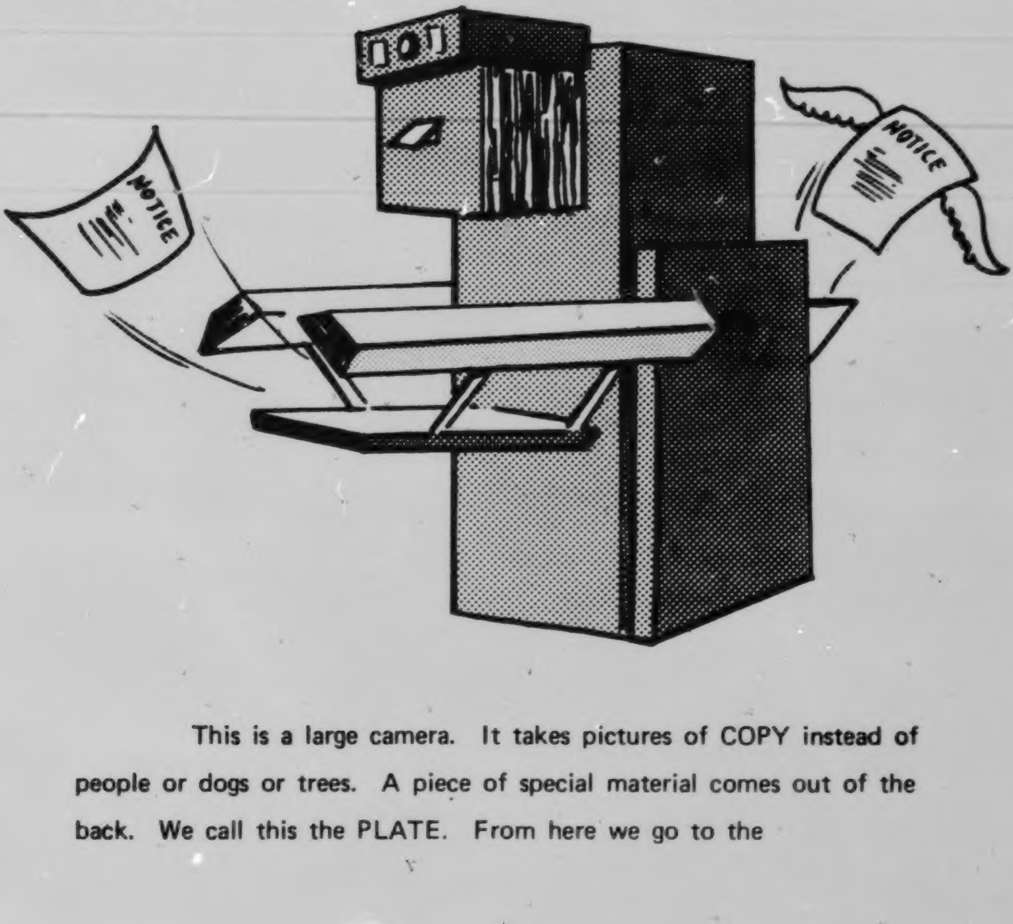
COPY – the words that form the idea or message to be printed.

OFFSET (off' set)

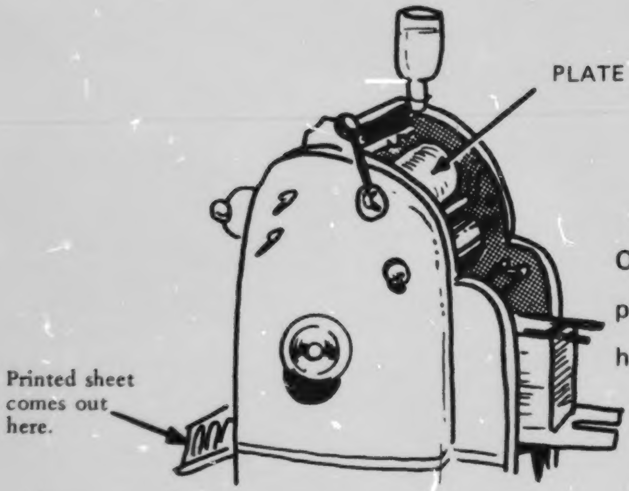
DUPLICATOR (dup' li ca tor). Name of the kind of printing press used in In-Plant shops.

PLATE – piece of material that goes on the press that has the copy on it.

Now that we have the image composed on paper, we go to the ITEK PLATEMASTER machine . . . "Itek" is just the name of the company that makes it.



This is a large camera. It takes pictures of COPY instead of people or dogs or trees. A piece of special material comes out of the back. We call this the PLATE. From here we go to the



OFFSET DUPLICATOR and place the plate on the press here.

and the printed sheet comes out of the other end of the press.

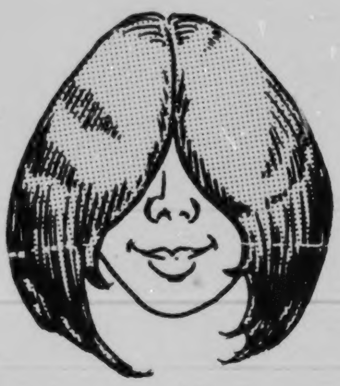
ASSIGNMENT (2): Write True or False in front of the following sentences:

__________The Itek Platemaster is used to make plates that are used on the press.

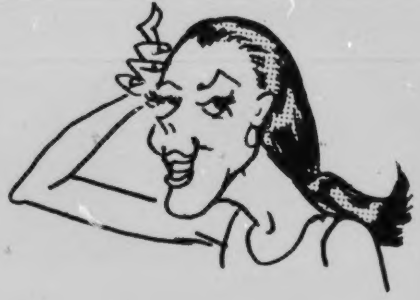
__________The offset duplicator prints the image from the plate onto the paper.

LESSON 4 – HOW DO WE DRESS?

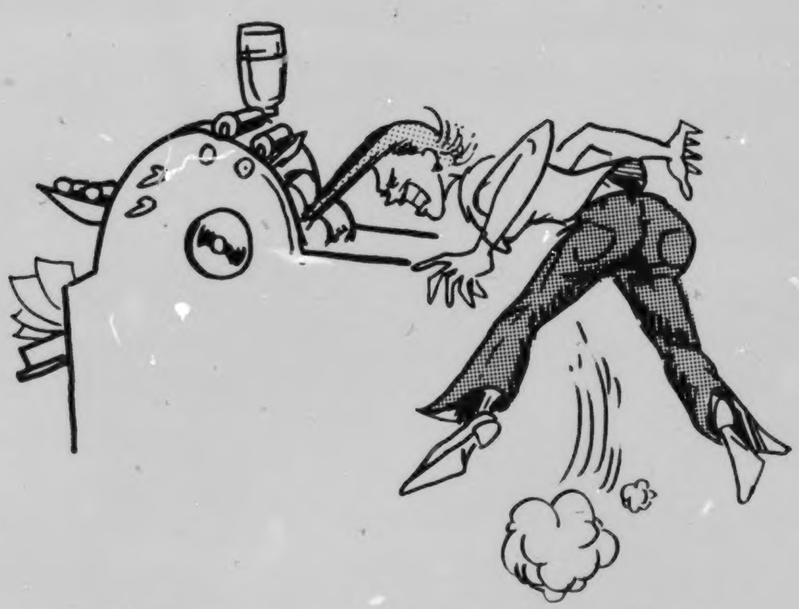
If you read and think about this lesson, you will understand how important it is to you.



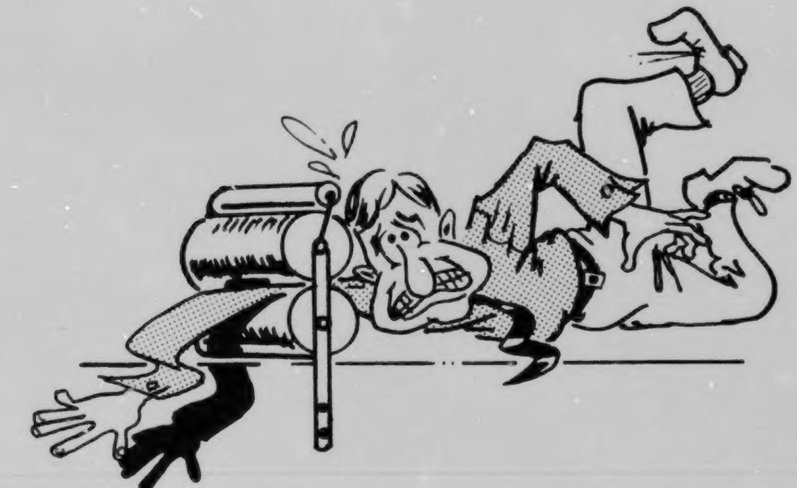
Long hair may look just great to you, but it is very dangerous around machinery.



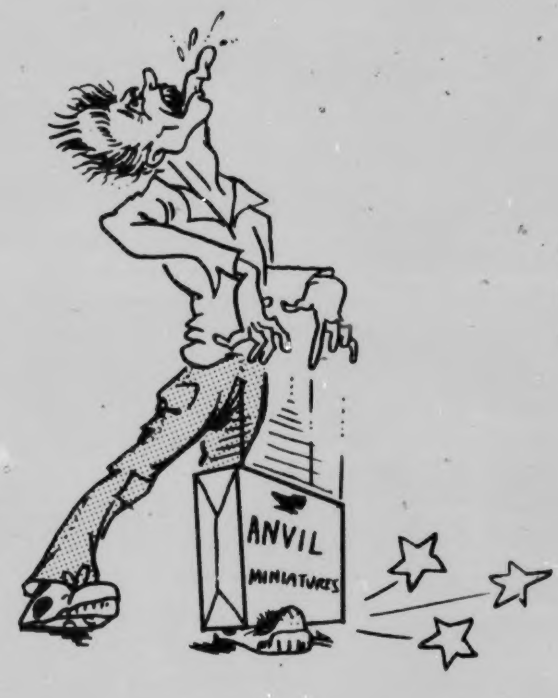
So keep it tied back. You will be able to see more.



It is easy for long hair to get caught in the machinery.



The same thing with long sleeves. They can get caught in moving parts of the machine and pull you right in. Wear short sleeves.



Sneakers are fine for play,
but bad for work.
Wear strong leather shoes.

ASSIGNMENT: Write True or False in front of these sentences:

__________ I like long hair because it looks good and is safe to wear around the shop.

__________ Sneakers are fine to wear in the shop.

UNIT II

PAPER

LESSON 1 – KINDS OF PAPER AND USES

By the end of this unit you will recognize the different kinds of paper and know their uses. You will be able to handle paper correctly.

Words to learn:

REAM – 500 sheets of paper

CARTON (car′ ton) larger box with two or more reams inside.

OFFSET – Paper that is good for books and can be printed on two sides.

BOND – Paper used in offices for letterheads, statements.

LEDGER – Strong paper. Used for records that must be kept a long time.

COATED – This paper looks different – it has a glossy or shiny surface. Used in magazines where there are many pictures printed.

COVER – Heavy and strong paper, used for booklet covers and report covers.

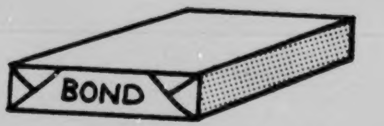
GUM – Paper with a dry glue on one side. Labels are printed on this, then they are pasted on cans and boxes.

MANIFOLD – Very light-weight paper. Used to make carbon copies.

MIMEO – Special paper for use on mimeo machines (office copying machines). Almost like offset but not as smooth. These papers are made in many colors.

Paper comes from the papermill wrapped in 500-sheet packages called REAMS.

Most IN-PLANT shops use paper that is 8½ x 11 inches. It comes in a carton with two or more reams packed inside.



ASSIGNMENT: Write True or False in front of these statements:

__________There are 1000 sheets in a ream.

__________Bond paper is used for printing labels.

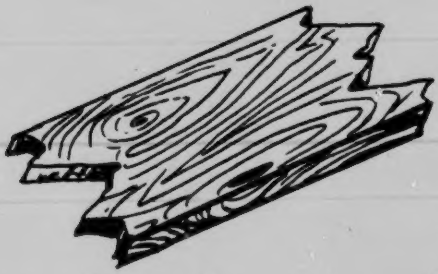
__________Manifold is a thin paper used for making carbon copies.

LESSON 2 – HANDLING PAPER

When you finish this lesson you will understand what GRAIN is in paper and be able to find it.

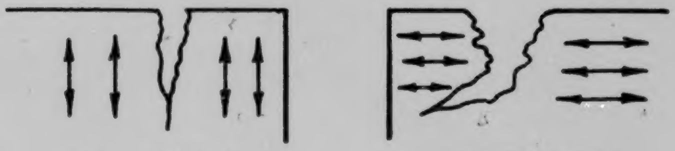
Word to learn:

GRAIN – means the direction of the fibers the sheet is made of.



Paper has a grain just like wood, but you cannot see it. Paper is manufactured with a grain. Paper comes off the paper-making machine in big rolls and is later cut into sheets.

You can easily tell which way the grain of a sheet goes by tearing it in each direction near one corner. It tears easily and straight WITH the grain, but all ragged AGAINST it.

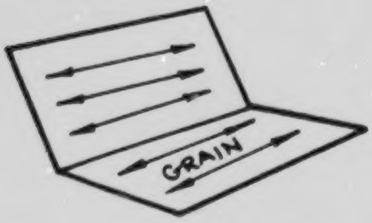


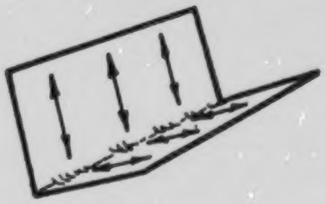
Tears with grain

Tears against grain

Why do we need to know? Because the grain should run the same way as the sheet going through the press. If it goes the other way, we will have trouble printing it.

Paper should always be folded WITH the grain to make it lie neat and flat. Paper folded AGAINST the grain will CRACK along the fold, and tear apart easily.





ASSIGNMENT: Fill in the blanks:

__________means the direction of the fibers in the paper.

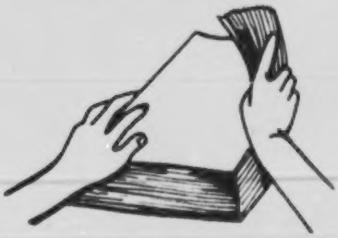
Paper has a __________the same as a piece of wood.

LESSON 3 – COUNTING PAPER

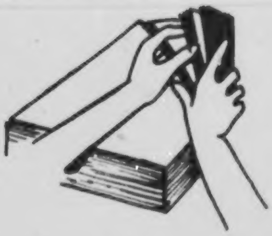
Counting is important to learn, because in an In-Plant shop you will often be printing LESS than a ream of paper. As a printer you should be able to count paper quickly and accurately. This is something I cannot teach you; you will just have to practice it until you can do it.

Here is how it is done.

Hold down with left hand.



Now – with your right hand fan the sheets apart by twisting your wrist.



Use your left thumb and count off 5 sheets, then 5 more, then 5 more until you have the right amount.

I know it is hard, but YOU can do it if you try and try.

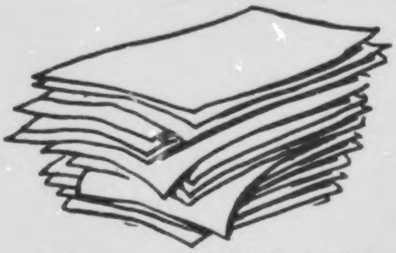
ASSIGNMENT:

Count accurately 45 sheets from a pile.

Count 75 sheets.

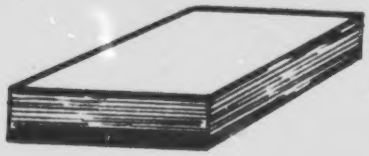
Count 100 sheets.

LESSON 4 – JOGGING PAPER



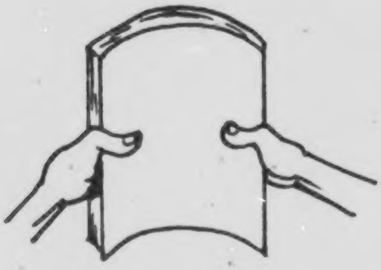
If you have a pile of paper that looks like this . . .

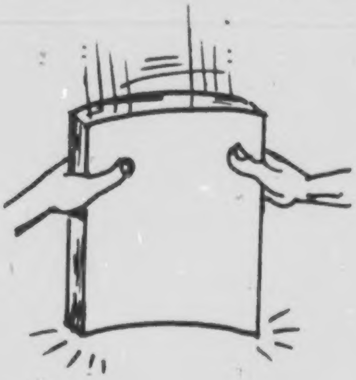
and you want it to look like this ––



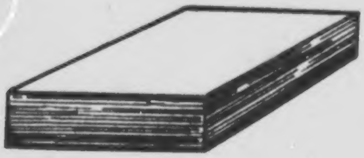
you must JOG it

First – Put one hand on either side of the pile and hold it above the table.





Then let it drop through your hands. Now – turn the pile around and jog the other side.

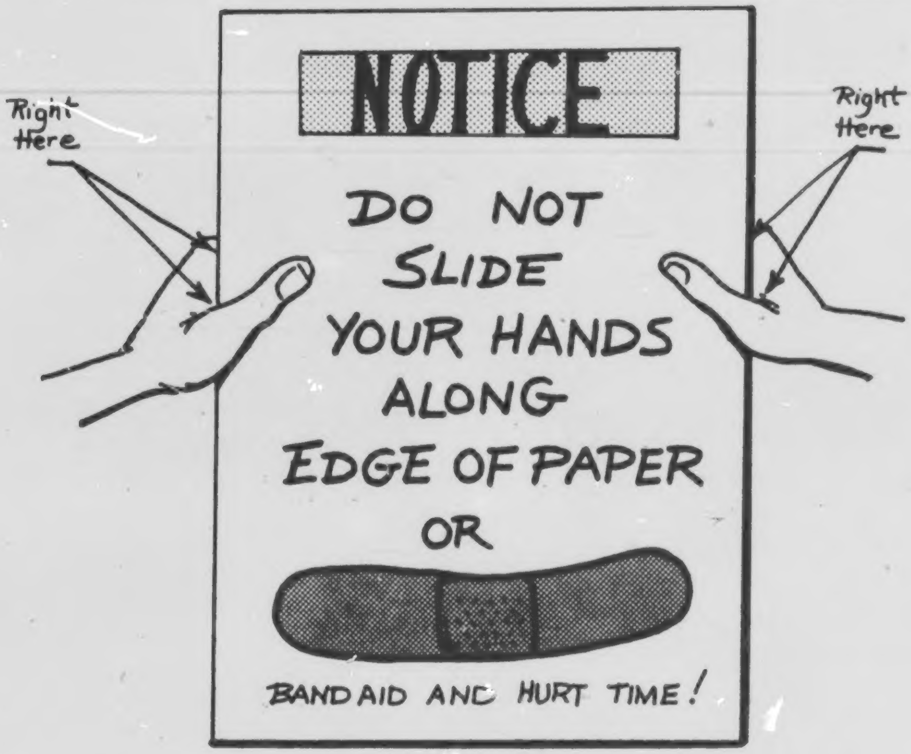


Does it look like this? Well, try again. It is NOT EASY, but YOU can do it. Keep trying.

LESSON 5 – AVOIDING PAPER CUTS

You know that if you drop a package of paper on your foot it will hurt.

You may NOT know that the edge of a sheet of paper can hurt you too. It is as sharp as a knife blade, and will cut you if you are careless.


NOTICE
DO NOT SLIDE YOUR HANDS ALONG EDGE OF PAPER OR
BAND AID AND HURT TIME!
Right Here
Right Here

UNIT III

COLD-COMPOSITION DEVICES AND MACHINES

LESSON 1 – HANDWORK, ART and LETTERING

The In-Plant shop often prints sheets that must be done fast – announcements, notices, maps, etc. Then we make the image by hand. You will produce your own copy for a printed job at the end of this lesson.

Words to learn:

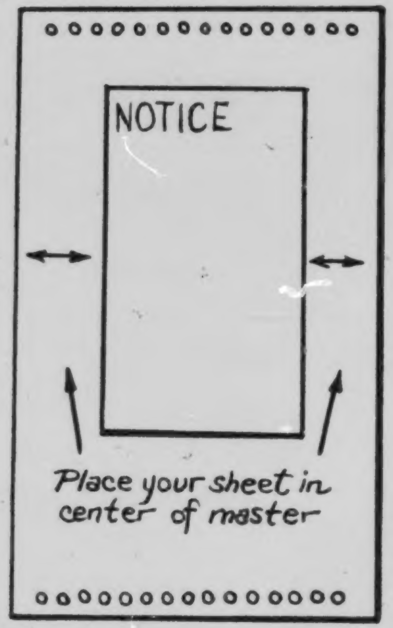
NOTICE (no' tice) – information about something important that is going to happen.

PRODUCE (pro duce') to make or print something.

OFFSET MASTER – special paper plate that can be written on, put on the press, and printed.

REPRODUCING PENCIL (re pro du' cing) – special pencil with black lead used to put an image on offset masters.

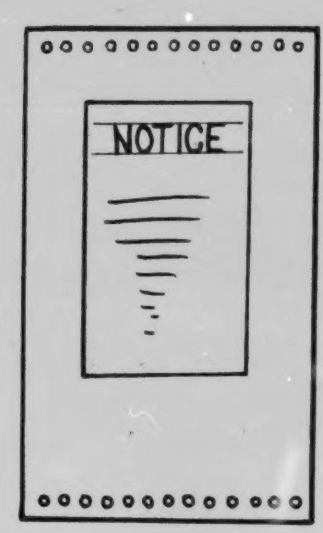
NON-REPRODUCING PENCIL – special pencil with red lead used for offset masters. It will not print.



OFFSET MASTERS are wider and longer than the paper we will print on. Use the non-reproducing pencil and draw a line showing the size of the sheet we are going to print. Use the non-reproducing pencil and lay out the message you are going to print. This will be a guide for the lettering and will help you fit the message on the paper with plenty of room.

Now – you see that the word "Notice" must start over a little farther. That is why we used the non-reproducing pencil. A wax pencil with a thick lead can be used for bold, heavy lines that will get attention.

Try to keep your lettering neat and straight and an even size. Use the red pencil for guidelines top and bottom, and the lettering will be better.



ASSIGNMENT:

Using an 8½ x 11 inch paper, produce a map showing how to get to your house, or an announcement of a party, or anything you would like to have printed.

If you make a mistake, you can erase. Use the red pencil eraser. Just go easy. If you rub too hard you will go through the special coating on the master and the sheet will print dirty.

LESSON 2 – PRESS-ON-IMAGES – PRESSTYPE OR ARTTYPE

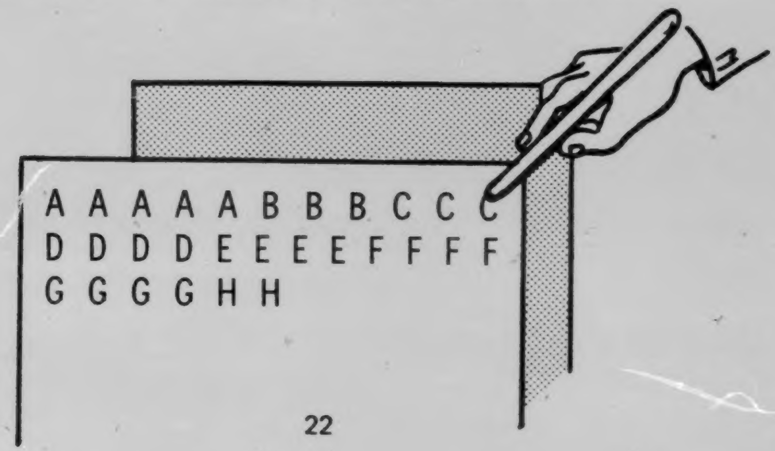
Most printed pieces are not hand-lettered. Presstype and Arttype were invented so you could do good lettering easily. Let's compose a word using Arttype.

LETTERING SHOULD LOOK AS IF SITTING ON A STRAIGHT LINE

NOT WANDERING ALL OVER THE SHEET

So – draw a straight line on a piece of paper, turn the paper over, and put it on the light table. Turn the light on and you will see you have a good guideline to follow.

The word we are going to print is "COPY." Get a sheet of press-on type. Find the C on the sheet, put it on the line and rub the letter with something smooth. Hold the sheet in place with one hand and lift it a little from the paper to see if the letter has printed. If the letter is not all there, put the sheet down in the same spot and rub again. Good. Now go on to the next letter and do the same. Keep the letters sitting on the line, and try to keep the same space between the letters. You will just have to learn how hard to rub the letter. When you have finished, practice with some more words.


A A A A A B B B C C C
D D D D E E E E F F F F
G G G G H H

ASSIGNMENT:

Draw a light line and compose your name.

LESSON 3 – THE HEADLINER

The next few lessons will cover the Vari Typer Headliner photocomposition machine. By the end of this section you will be able to compose a headline, following instructions on the copy.

Words to learn:

PHOTO COMPOSING MACHINE means a machine that works like a camera, to set copy.

COPY means the words and sentences that we get from the customer to be printed.

HEADLINER – (head' lin' er) Name of one machine

FONT – One complete kind of type with all the letters, numbers, and punctuation marks (periods, commas, etc.) in the same general style.

STYLE – Shape of the letters

TYPEMASTER – Round, record-like clear plastic with the font on it.

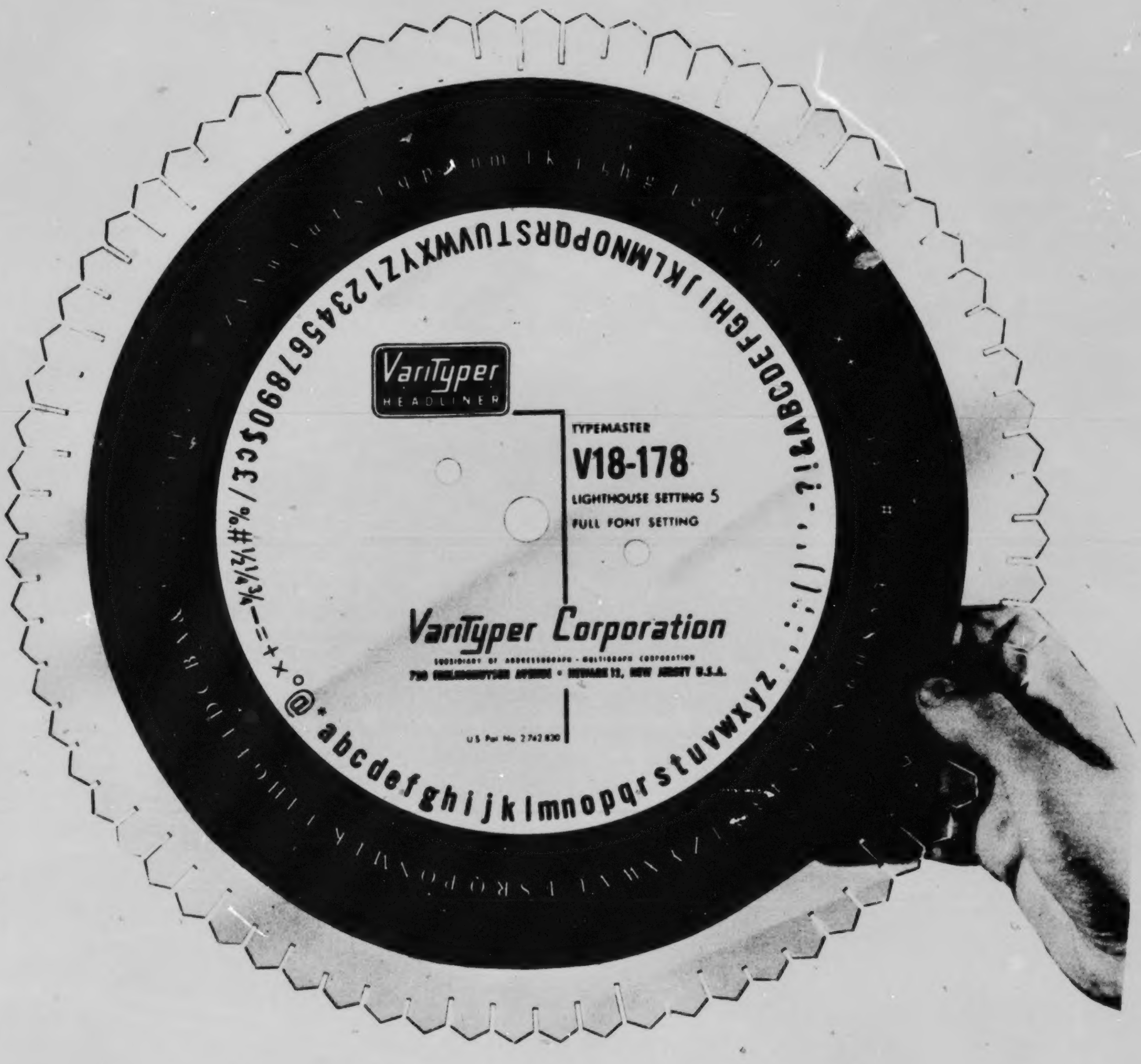
The Typemaster

Let's look at the Typemaster first. A picture of a Typemaster is on the next page.

Each Typemaster has a number, so we can tell them apart, like

4854

The first two numbers tell us the size of the type: 48 points in this case, using the old printer's system. This tells us how tall the letters are. There are 72 points in an inch.


VariTyper
HEADLINER
TYPEMASTER
V18-178
LIGHTHOUSE SETTING 5
FULL FONT SETTING
VariTyper Corporation
SUBSIDIARY OF ADDRESSOGRAPH - MULTIGRAPH CORPORATION
720 FRELINGHUYSEN AVENUE • NEWARK 12, NEW JERSEY U.S.A.
U.S. Pat. No. 2 742 830
ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890$¢
abcdefghijklmnopqrstuvwxyz

The next two numbers tell us the style.

Type number 4854 looks like **THIS** in 48-point.

Type number 3054 looks like **THIS** Both are the same STYLE or kind.

Number 4854 looks like **THIS** and 4882 looks like ***THIS*** They are both the same SIZE but a different STYLE.

ASSIGNMENT:

Go to the rack and pick out two typemasters, both the same style but different sizes.

Now pick out two that are the same size but different styles.

Fill in the blanks:

The ________ ________numbers tell us the size of the type, and the second two numbers tell us the ________

O. K. That was easy. Now there is one more thing we must know about. That is CASE. There are only two cases.

1. UPPER CASE – CAPITAL LETTERS
2. lower case -- small letters

In the smaller sizes of Typemaster fonts, up to 48-point, there is room for BOTH upper-case and lower-case letters on the master. As the letters get bigger, there is room for only one case. The upper case is on one master and the lower case and numbers are on the other. The Typemaster number is followed by a letter; U for UPPER and L for lower.

UPPER-4854U

lower-4854L

ASSIGNMENT:

Pick out of the rack two Typemasters of the same size and style - one the upper case and the other the lower case.

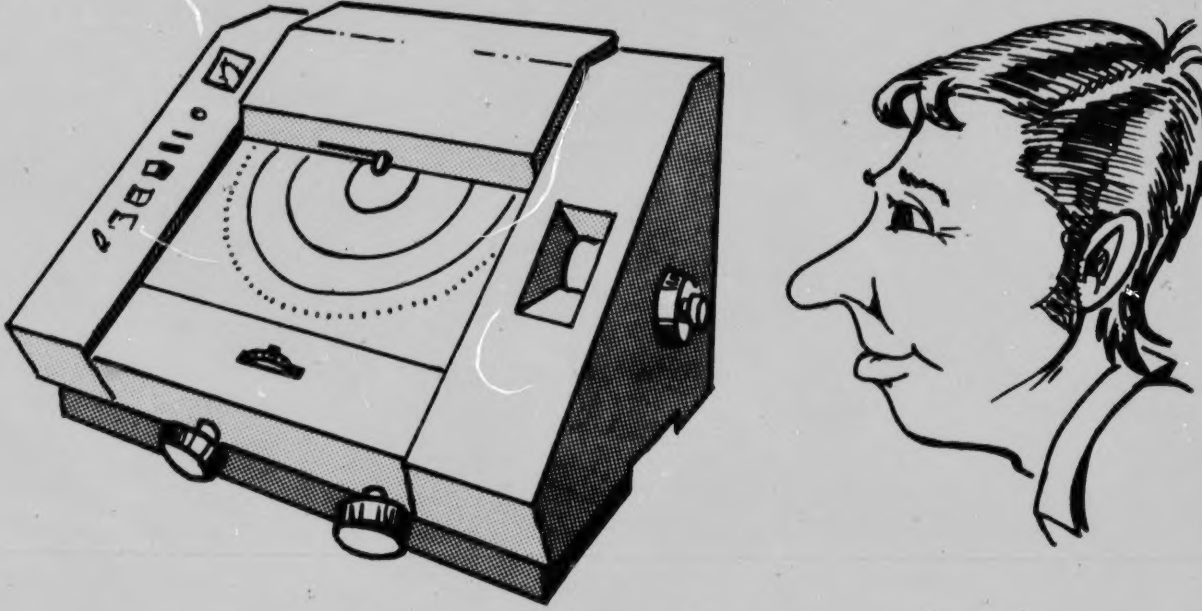
Write True or False in the spaces:

__________Some Typemasters have both upper- and lower-case letters on the same master.

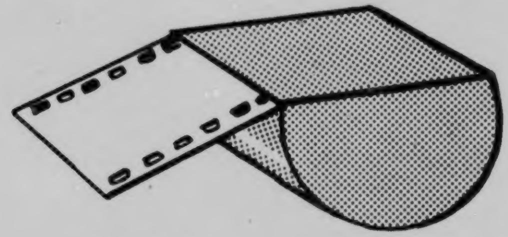
__________Some Typemasters have only one – upper or lower.

LESSON 4 – LOADING THE HEADLINER

Now – let's look at the Headliner machine itself. By the end of this lesson you will be able to load the Headliner.

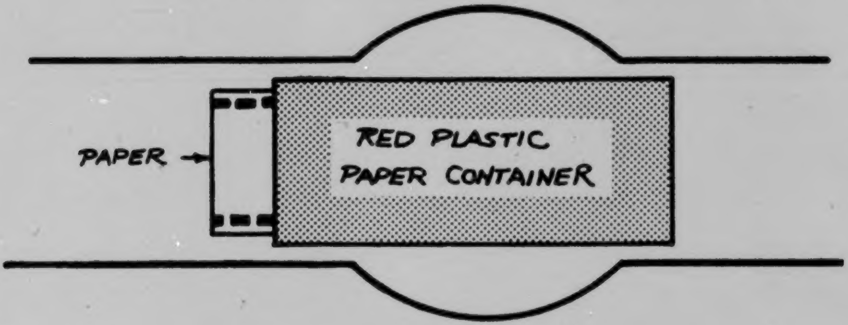


The Headliner prints on special paper that must be kept in the dark. We buy this paper in red plastic containers that look like this:

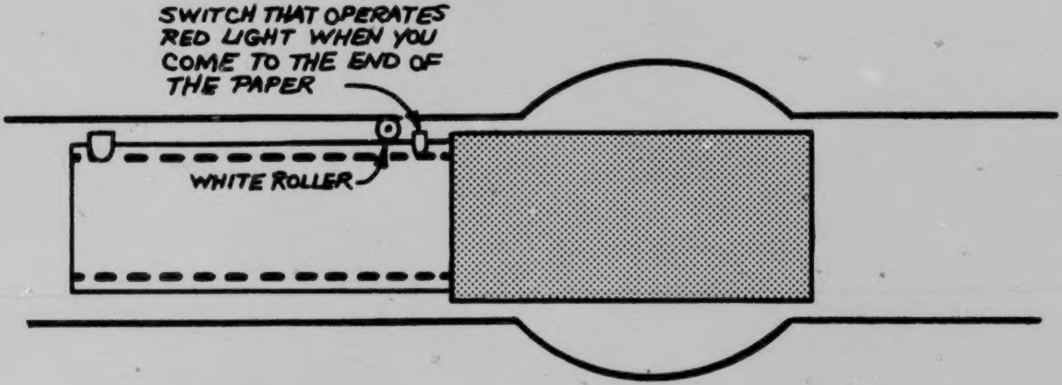


The paper is rolled up inside and comes out through a slot in the top. To put it in the machine, lift the lighthouse, or cover, and look inside.

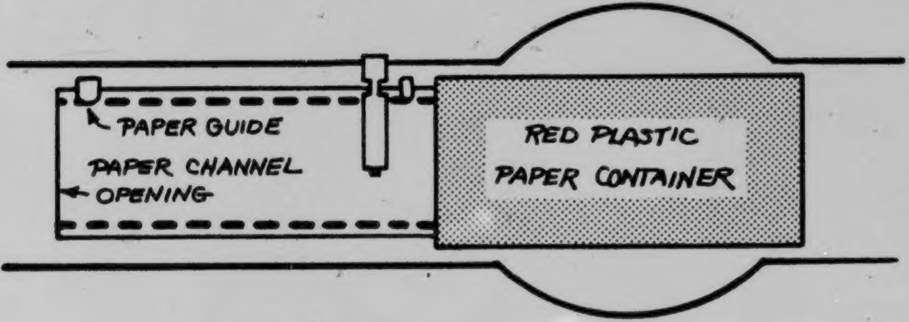
On the right-hand side you will see a place for the paper.


PAPER
RED PLASTIC
PAPER CONTAINER

Drop it in – it can go in only one way. Good. Now, lift that small white roller so it stands straight up.

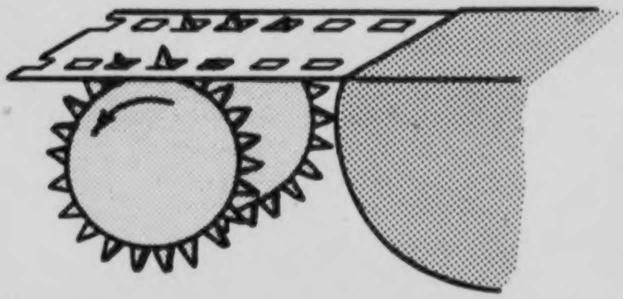

SWITCH THAT OPERATES RED LIGHT WHEN YOU COME TO THE END OF THE PAPER
WHITE ROLLER

Pull the paper past this roller. Now you come to a small, flat metal spring. This should be pulled back so it rests on the edge of the paper. This makes a light go on when the paper is all used up. Put the white roller back down. It keeps the paper flat.

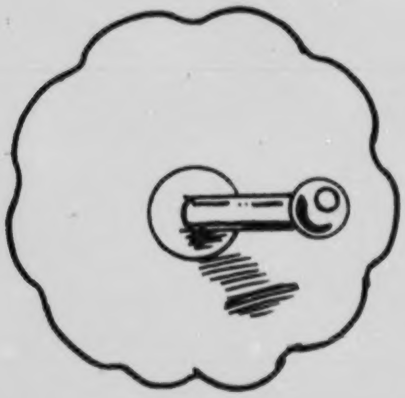

PAPER GUIDE
PAPER CHANNEL OPENING
RED PLASTIC
PAPER CONTAINER

Pull the paper past the black pad, and past the second paper guide.

You see that the paper has holes along the sides. These are called sprocket holes, and they fit on special wheels called sprockets. Just like the chain on your bike. This is how the paper is moved through the machine.



Now push the paper into the slot as far as it goes. Turn the wheel on the left front of the machine. Turn wheel to right. You will see the paper move to the left – into the machine.



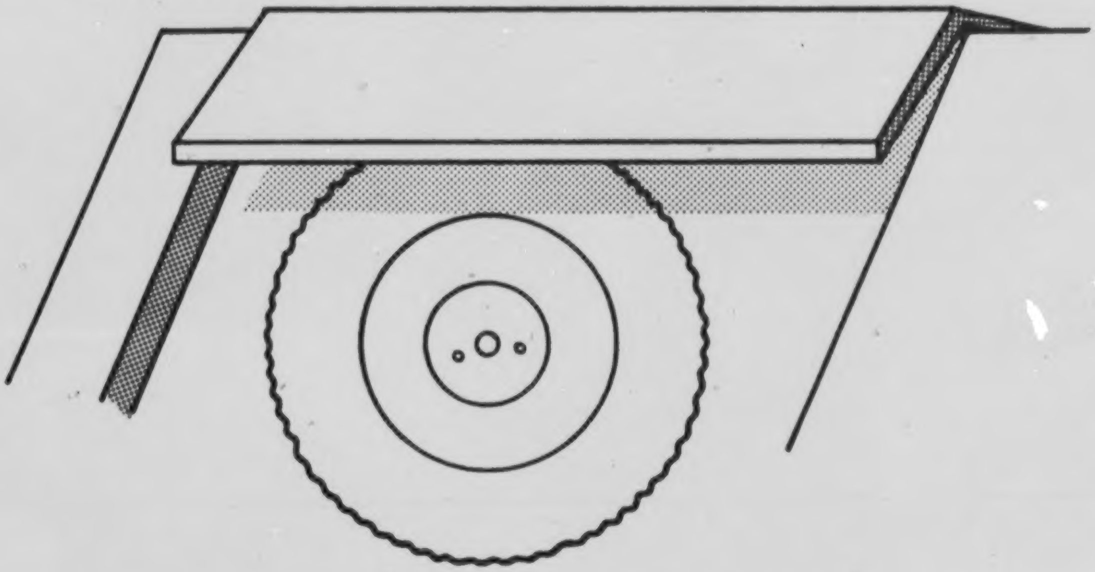
To remove paper, pull center button out of the paper-feed knob about one inch. Now you can pull the paper out of the machine.

ASSIGNMENT:

Load the paper into the empty machine. Feed it into the machine so it is ready to print. Practice putting paper in and taking it out.

LESSON 5 – PUTTING THE TYPEMASTER IN THE MACHINE

The Typemaster has three holes. One right in the center and one on either side. These holes fit on pins on the machine, so you can't get it on wrong.



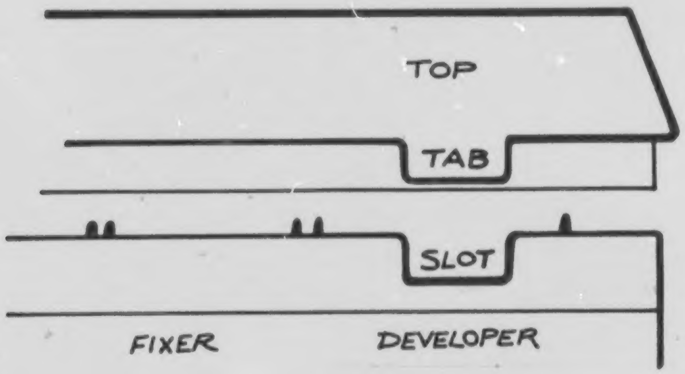
Lift the lid just a little and slide the master in until it fits on the three pins. Be sure to push it down as far as it will go. Put the lid back down again.

ASSIGNMENT:

Try this a few times.

LESSON 6 – FILLING THE TANK

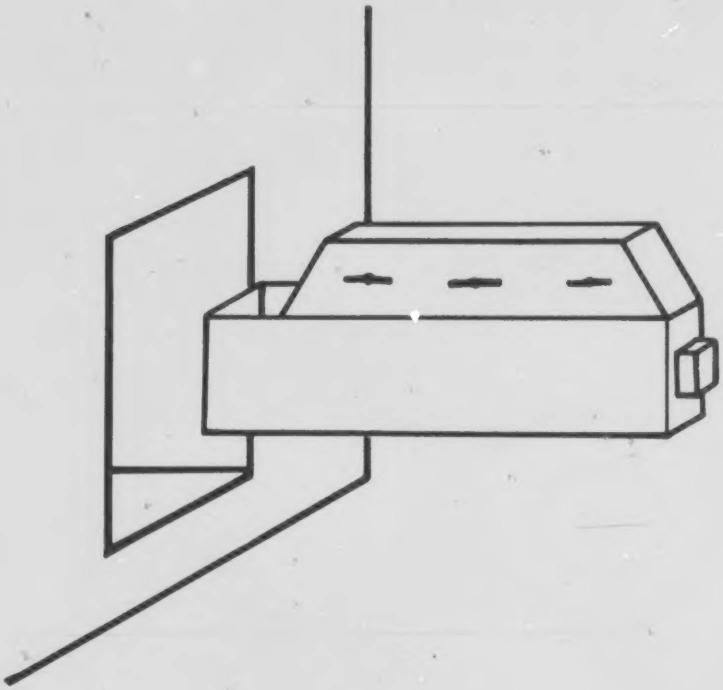
The opening in the right-hand side of the machine is where the tank goes. Pull the tank out and look at it.



Lift the top off and look inside. If you look along the bottom edge of the top, you will see a little tab. This fits into a slot in the bottom piece. The reason – to make sure you put it back the right way.

Now look in the tank part and you will see three places to put the chemicals. Near the top of each there is a line in the side of the tank. Put tank under the COLD water tap and fill to this line. Fill all three, for practice. Put the top back on and put the tank back into the machine. Do it this way.

Line up the three bars as they are shown in the next drawing, and push the tank into the machine as far as it will go. This is very important. Push hard. Always make sure the three bars are facing you when you put the tank back in. That means you are putting it back right.



Now take the tank out, dump the water out, and refill tank again. Put it back into the machine. O.K? Know how to handle it now? Good.

Get out the DEVELOPER and the FIXER. It is very important that you put each chemical in the right place.

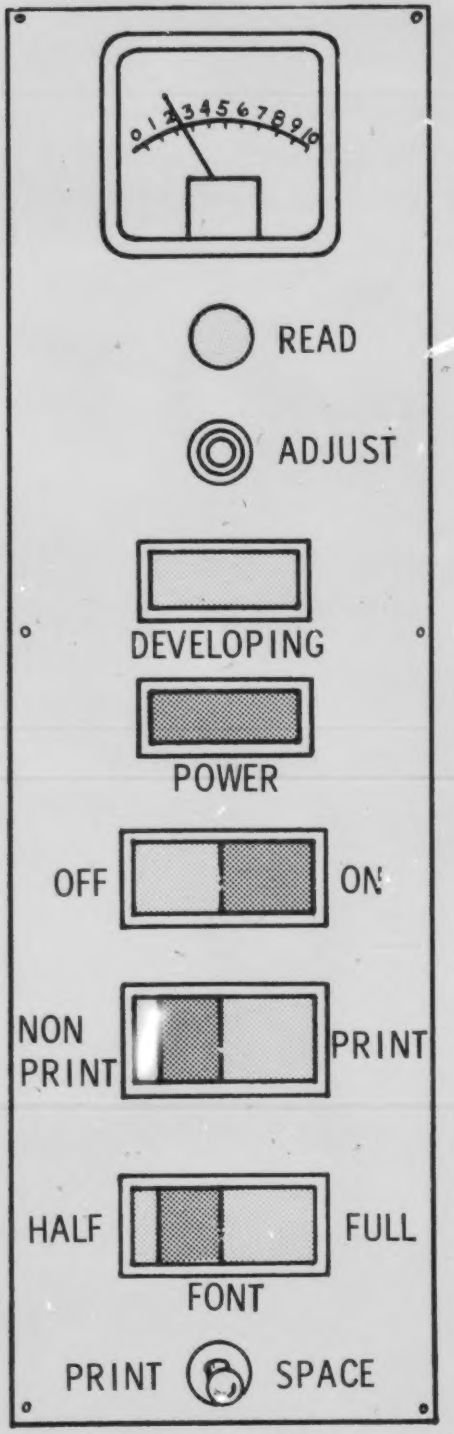
Make sure that the DEVELOPER goes into the part of the tank that says DEVELOPER. Fill the DEVELOPER tank halfway. Add water to the line.

Now fill the WATER tank up to the line.

Now fill the FIXER tank with FIXER, also up to the line. Put the top back on.

LESSON 7 – SETTING THE CONTROLS ON THE HEADLINER

This lesson will show you how to set the controls. You will be able to print your name correctly when you learn all the controls.



This is the exposure gauge. It tells us how much light the machine is set for. Push the button marked READ and the needle will move. For 72-point type, needle should be at 6.

For 12-point type, needle should be on 3. To change, turn the button marked ADJUST.

When the paper is in the developing tank this will light up with an amber (yellow) color.

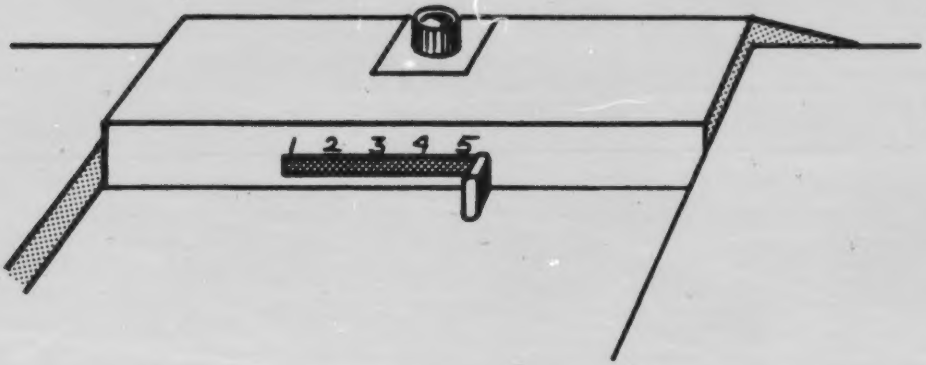
When you start the machine, a red light comes on here and tells you that the machine is on.

Push the PRINT side of this switch. NON-PRINT is for measuring.

"FULL" and "HALF" mean full and half fonts on the Typemaster. (See lesson 3, page 24.) If the number on the Typemaster has the letter U or the letter L after the number, it is a HALF FONT. No letter means it is a FULL FONT.

Push this lever to the left and you will print a letter. Push it to the right and you will make a space, as at the end of a word.

The next control to be set is the Lighthouse setting.



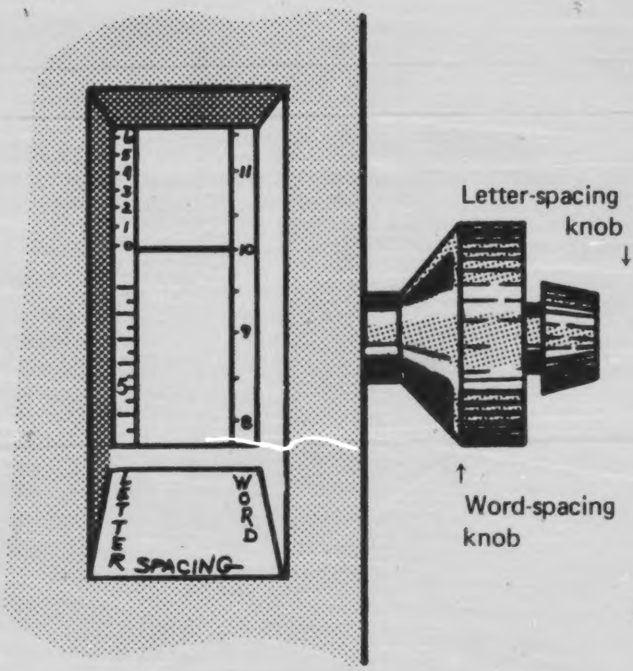
The Lighthouse setting is printed on the Typemaster under the number. For example,

3054
Full font
Lighthouse Setting 5

That is where the lever is set in the drawing. Always set what the Typemaster tells you to.

Spaces between letters and words:

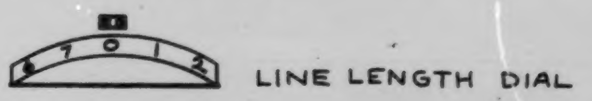
To set the space between letters, turn the small knob. For this lesson, turn to the number 2 on the letterspacing dial. For the space at the end of each word, turn the large knob until the number 5 lines up with the indicator line.

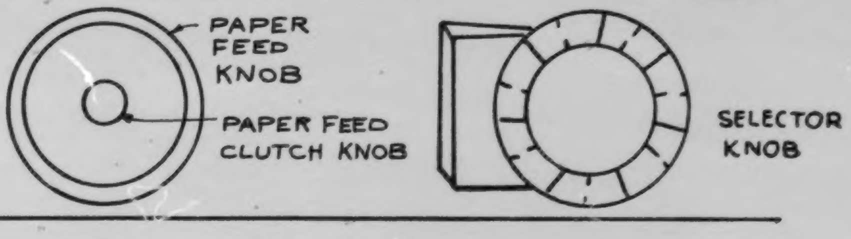

Letter-spacing knob
Word-spacing knob
LETTER SPACING
WORD
11
10
9
8

ASSIGNMENT:

Set exposure needle to 4. Set Lighthouse setting to 3. Set Letterspace to 2 and word space to 3.

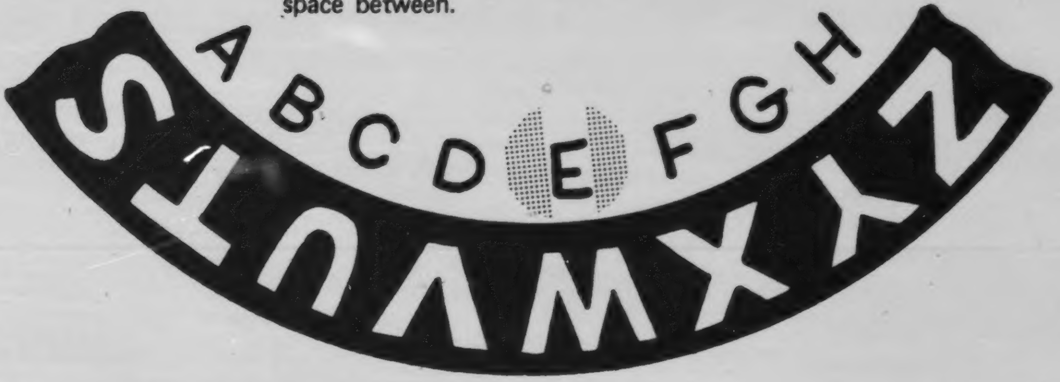
LESSON 8 – COMPOSING A LINE OF TYPE


6 7 0 1 2
LINE LENGTH DIAL


PAPER FEED KNOB
PAPER FEED CLUTCH KNOB
SELECTOR KNOB

Turn the LINE-LENGTH DIAL around to "O" by hand. Turn PAPER FEED KNOB to the right. Watch the LINE LENGTH DIAL. Stop when you see the "O" again. You have just fed fresh paper into the machine.

If you look through the Typemaster near the bottom where the black letters are, you will see a grey circle with a wide space between.

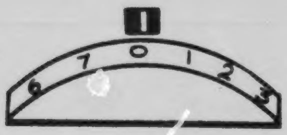

ABCDEFGH
STUVWXYZ

This is where you put the first letter of your first name. Move the PRINT lever to the left and let it go. You have just printed the first letter of your first name.

ASSIGNMENT:

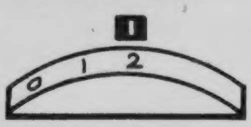
Using all capital letters, print the rest of your name. Put two spaces after your first name and four after your last name. Remember – for a space you move the PRINT lever to the RIGHT, just as it says on the machine. Set the name of the town where you live, in capitals.

LESSON 9 – CUTTING AND DEVELOPING THE LINE



Move the LINE LENGTH DIAL to O by hand.

Turn the PAPER FEED KNOB to the RIGHT. Make the dial go around once, pass 0 and stop on 2. This moves the last letter printed away from the knife.



Raise the cut-off lever on the left of the machine as far as it will go and HOLD IT THERE UNTIL THE AMBER LIGHT GOES ON. Then let it go. The light tells you that the machine is pulling the paper through the developing tank. Wait about two minutes and the paper will come out of the machine.

Name spelled right? If not, do it again.

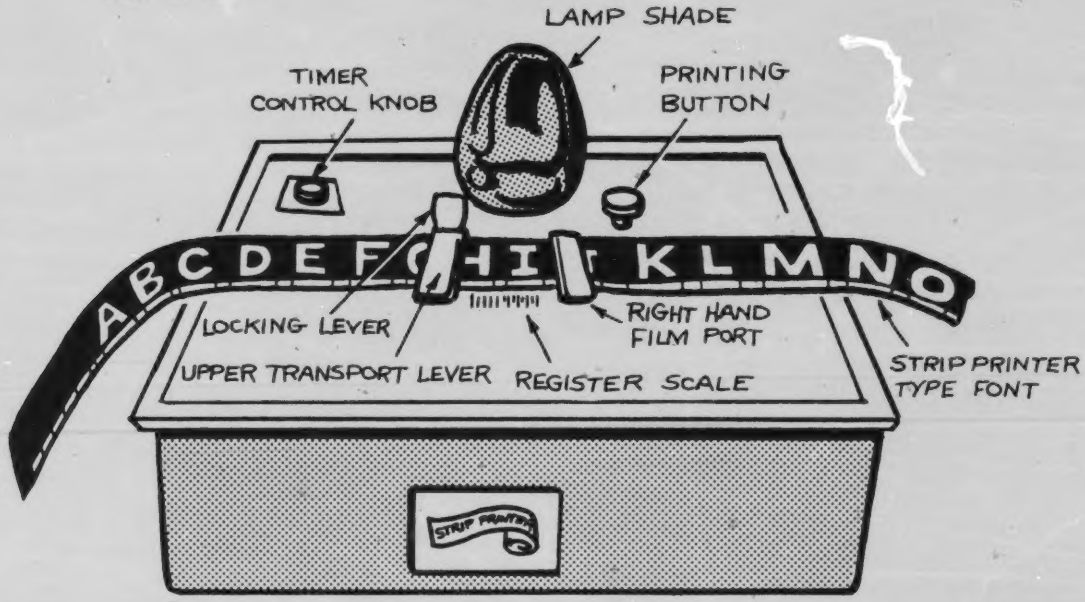
ASSIGNMENT:

Write or copy a simple slogan or title. Point it on the Headliner and develop it.

LESSON 10 – THE STRIP PRINTER

At the end of this section you will compose a line of copy on the Strip Printer.

The Strip Printer is a photo-composing machine used for composing large or small type that is different from typewriter type. Let's look at it.


LAMP SHADE
TIMER CONTROL KNOB
PRINTING BUTTON
ABCDEFGHIJKLMNO
LOCKING LEVER
RIGHT HAND FILM PORT
UPPER TRANSPORT LEVER
REGISTER SCALE
STRIP PRINTER TYPE FONT
STRIP PRINTING

The type is on the long strip of film. Each strip has a different font, or typeface. Each strip is a different size – from 6 to 96 points. The copy is composed one letter at a time. A light shines through the film and exposes the paper. Just like the Headliner.

ASSIGNMENT: Answer True or False:

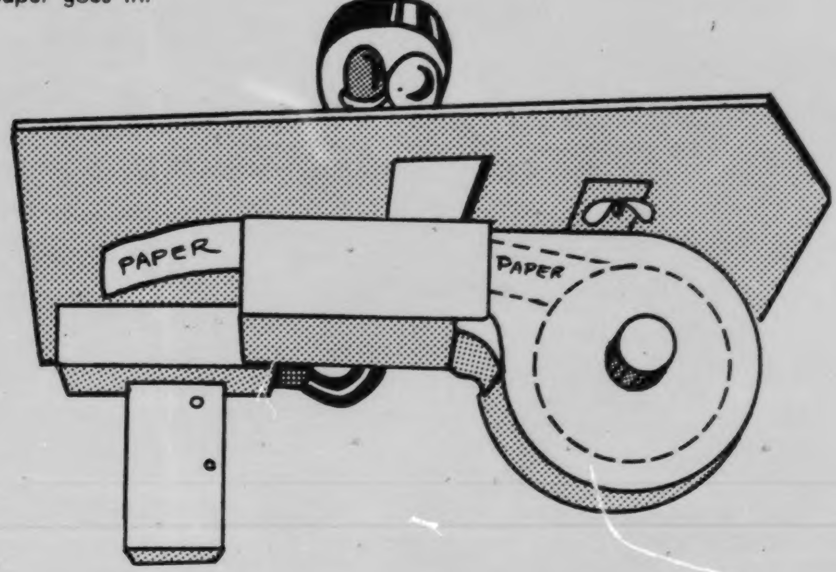
__________The Strip Printer is used to compose copy on paper tape.

__________This machine prints one letter at a time.

LESSON 11 – LOADING THE PAPER

When we get the paper, it is on a roll

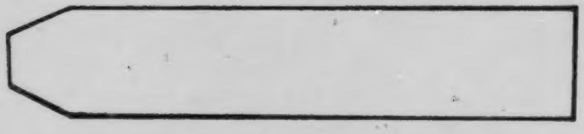
Lift the lid of the machine and you will see the box that the paper goes in.



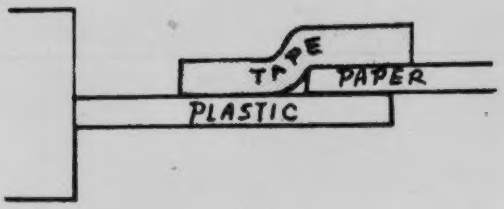
It is called a MAGAZINE. The magazine has a red plastic cover held on with a hand screw. Take this cover off and put the paper over the hub and feed it into the machine. Look at the drawing.

There is a plastic strip that is used to feed the paper into the machine.

This end of the strip goes in first.



Feed the plastic into the machine. Leave about an inch sticking out of the machine.



Tape the end of the paper to the plastic. Pull the plastic through the machine, using the other end of the plastic.

When the paper comes out the other side, take the tape off. Put the plastic inside so it won't get lost. You will need it again.

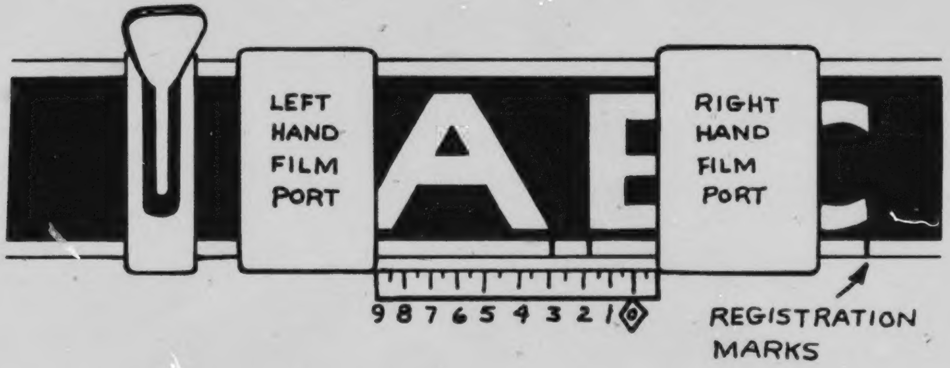
Snap the magazine in place. Close the lid.

ASSIGNMENT:

Try this operation several times. You will soon be able to do it quickly and easily.

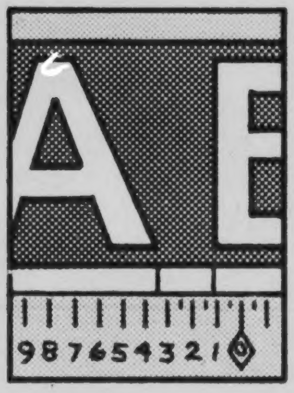
LESSON 12 – COMPOSING A LINE

Pick out a type-font strip and feed it into the machine. Feed it under the right-hand film port, under the glass and out the left-hand film port. If you do this several times it will become easy. Practice.

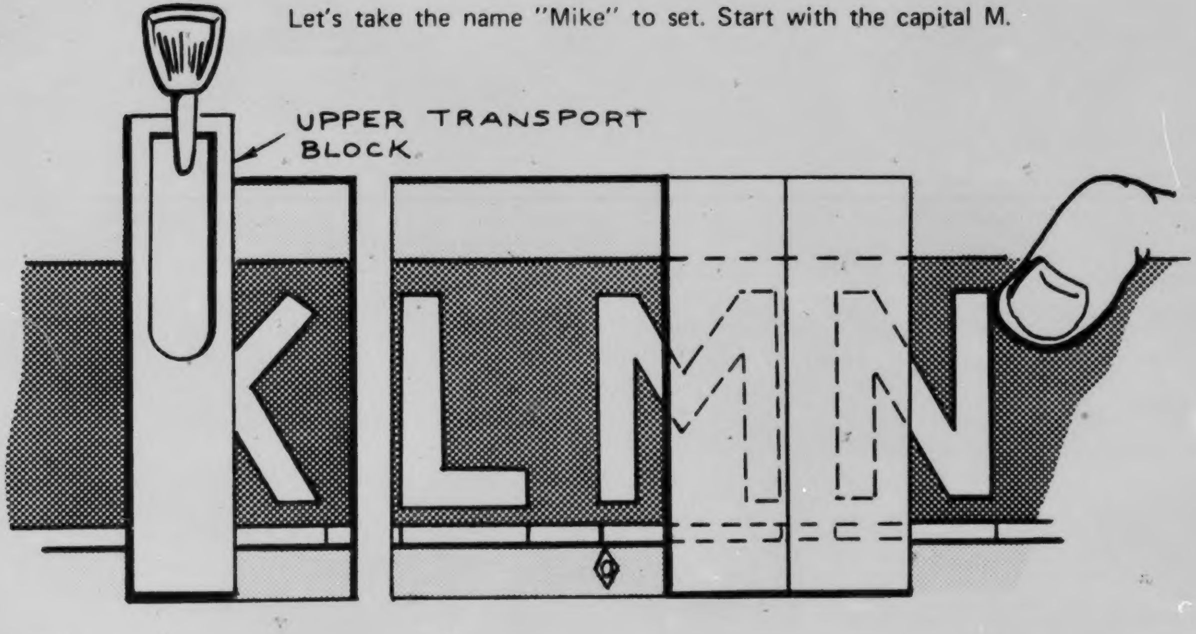

LEFT HAND FILM PORT
A
B
RIGHT HAND FILM PORT
C
9 8 7 6 5 4 3 2 1
REGISTRATION MARKS

Look at the marks in the clear area at the bottom of the strip.

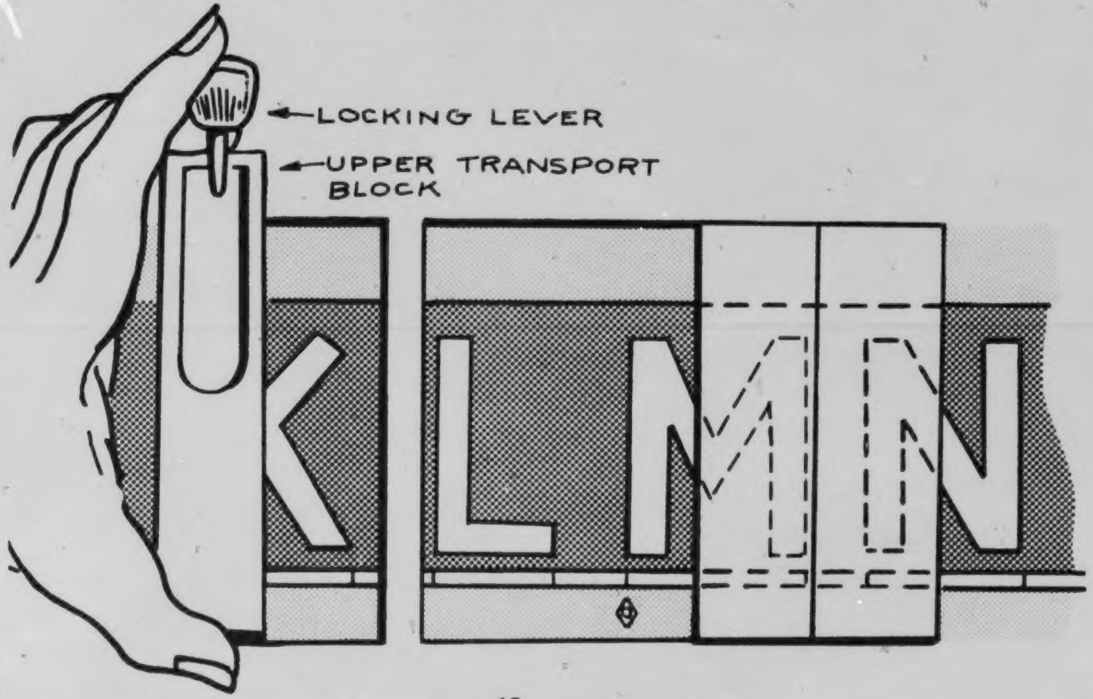
These marks are called REGISTRATION MARKS. They are used with the REGISTER SCALE under the glass for letter spacing and word spacing.


A
E
9 8 7 6 5 4 3 2 1

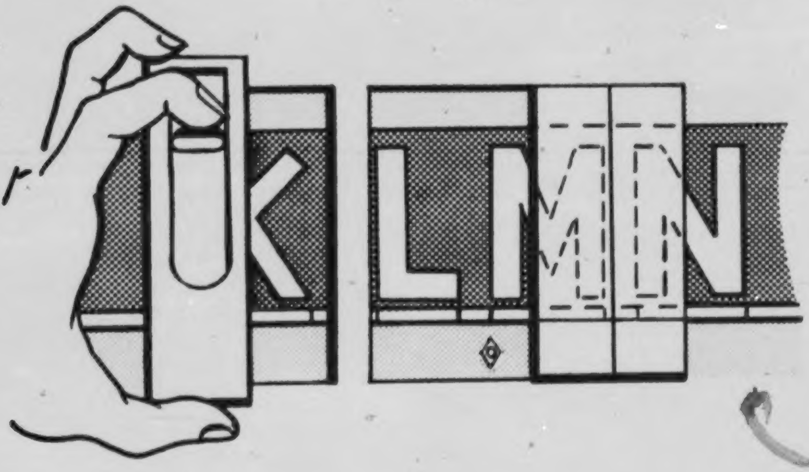
Let's take the name "Mike" to set. Start with the capital M.


UPPER TRANSPORT BLOCK
K
L
M
N

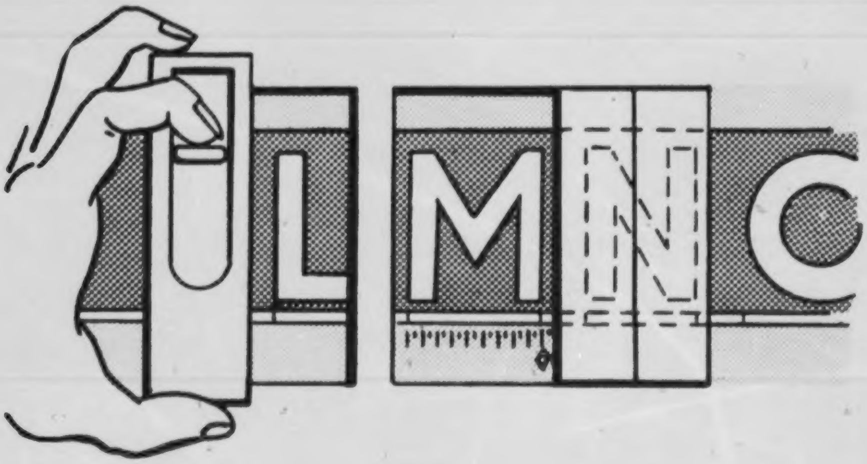
With your right hand, move the font until the mark at the LEFT of the M is in line with the 0 on the register scale.


LOCKING LEVER
UPPER TRANSPORT BLOCK
K
L
M
N

Hold the UPPER TRANSPORT BLOCK between your thumb and your SECOND finger. Put your FIRST finger on the LOCKING LEVER.

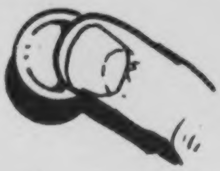


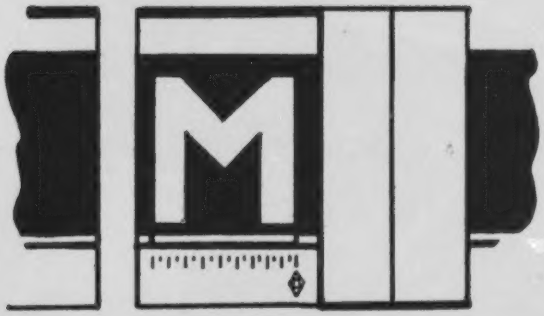
Hold the TRANSPORT BLOCK. Move your first finger closer to your thumb. This locks the film font, the shutter, and the paper together.



Move your hand to the left until the mark at the RIGHT of the M lines up with the 0 mark on the scale.

Take your LEFT hand OFF the machine. Press the PRINTING BUTTON.





The PRINTING BUTTON turns the light on and exposes the paper. The letter M has now been printed. Now, find the next letter, "I", on the font. Do the same thing with that letter.

To put space between words, or names, line up ANY mark on the film so it lines up with the 0 on the scale. With your LEFT hand on the TRANSPORT BLOCK, move your hand to the LEFT until that mark is on the line for number 4 on the scale. For larger type move more; for smaller type move to number 21.

ASSIGNMENT:

Compose your name.

LESSON 13 – DEVELOPING THE LINE

After you have finished printing your name, lock the TRANSPORT BLOCK. Move it all the way to the left. Let go. Lock again and move it again. You must do this five times. This moves the paper out of the machine, so that when you tear the paper you get all the printing.

Turn off the regular light. Use the safety light to see by. Raise the lid. You will see the paper curled up inside. Tear it off near where it comes out of the machine.

You can't see any printing. It must be developed.

Be careful that the paper does not get out in the light. If light gets on the paper, it will ALL turn black when it is developed. Take the red plastic cover off the PROCESSOR and feed the paper into the curved metal channel. Turn the switch on. Rollers inside the machine will pull the paper through the developer and fixer. The finished printed line will come out of the other end of the machine. This will take about a minute.

If you do not have a processor, you can develop the paper in a tray, just like a photo print. You will need a darkroom for this.

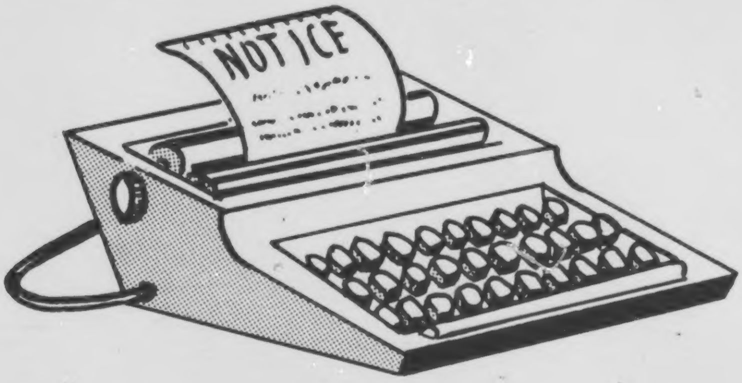
FRANK FORTER

ASSIGNMENT:

Write a simple slogan or caption. Produce a camera-ready copy of it on the Strip Printer.

LESSON 14 – ELECTRIC TYPEWRITERS

We are NOT going to learn to use the Selectric Typewriter in this lesson. We ARE going to see how it is used in the In-Plant shop. Remember Lesson 1 of this unit? We used OFFSET PAPER MASTERS. Then we used pencils and pens to put the image on the master.



A special carbon ribbon is used on the typewriter, and the message is typed right on the master.

Do you remember the name for this kind of composition? If you forgot, go back to page 3 and look it up!

We will be printing many things using offset paper masters with typewriter copy.

ASSIGNMENT:

Write True or False in the blanks.

__________Typewriter composition is cold composition.
__________Typewriters can be used for printing.
__________Typewriter composition is often used in a letterpress shop.

UNIT IV

LAYOUT AND DESIGN

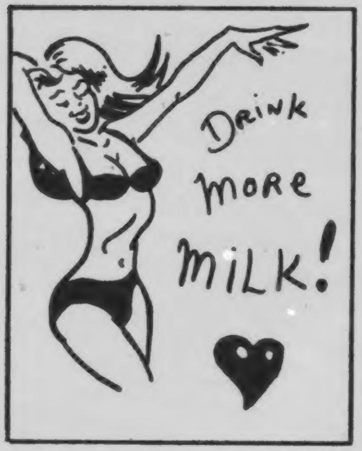
LESSON 1 – WHAT IS A DESIGN?

At the end of this unit you will lay out two different pages. You will measure accurately, using both the printer's point system and inches.

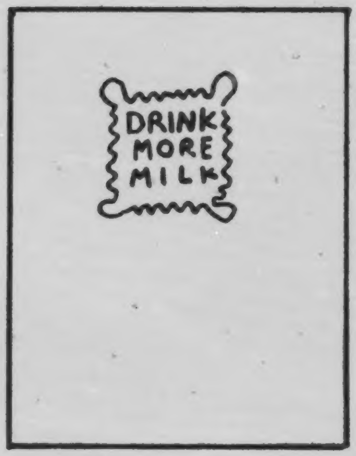
Every time you look at the newspaper or a magazine you are looking at a layout or design that is finished.

It all started with an IDEA, a thought that someone had. Before it could be printed, someone had to draw something – maybe only hand lettering. Something that would help a person reading the message to better understand the idea.

Design is the second idea – HOW to put that idea or thought on paper so people will look at it.


DRINK
more
MILK!

Which design
would YOU
look at and
Read?????

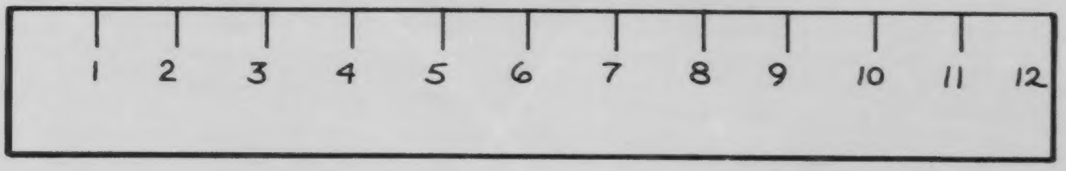

DRINK
MORE
MILK

LESSON 2 – MEASUREMENTS – INCHES

OH, OH! Here comes the man with the ruler.

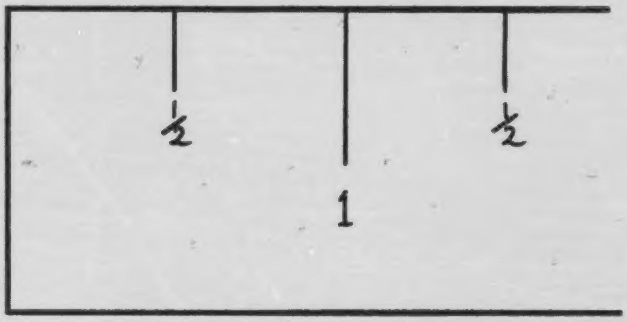
Before we can make a layout or design, we must know how to use the ruler accurately. This lesson will help.

Printers call the ruler by different names. Usually it is called a SCALE. The other name we use is LINE GAUGE. The one we work with mostly is 12 inches long.

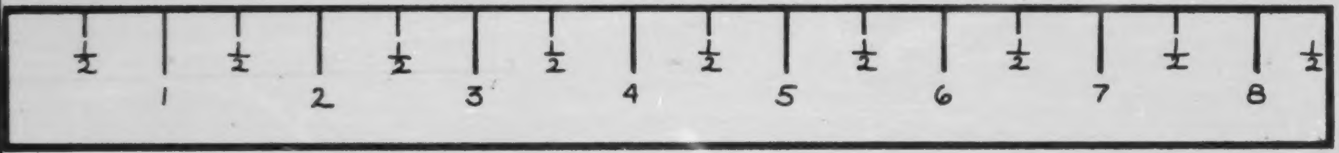


If it were marked off only in 12 divisions it would not help us very much. We need more marks on the scale so we can measure more accurately.

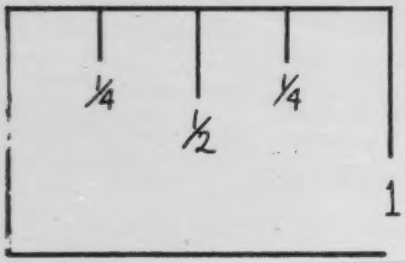
Each inch is divided into smaller parts, starting with ½. There are two halves in each inch. (The drawing is made extra-large.)



Now we will see with a scale like this how wide this page is.

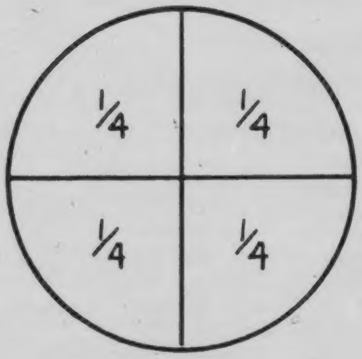


This page is 8 full inches and ½ inch more. This is written 8½"

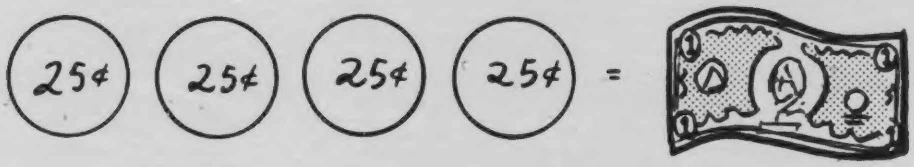


For more accurate measurements, each ½ inch on the scale is divided in half again. These are called QUARTERS, written as ¼. There are 4 quarters in an inch. Count them.

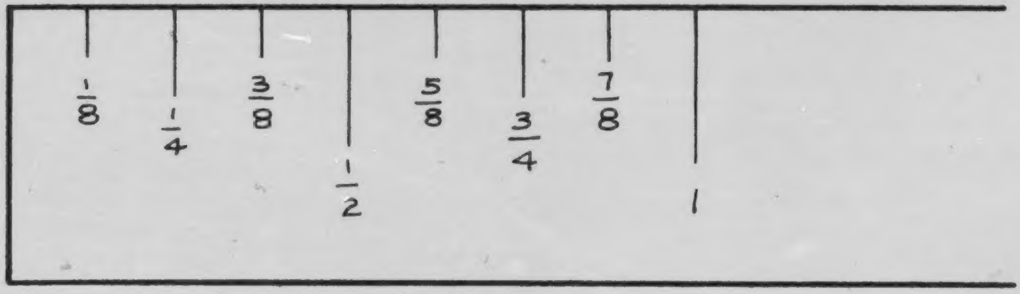
Think of a silver dollar that has been divided in half two times. You have 4 quarters. Count them.



Or –

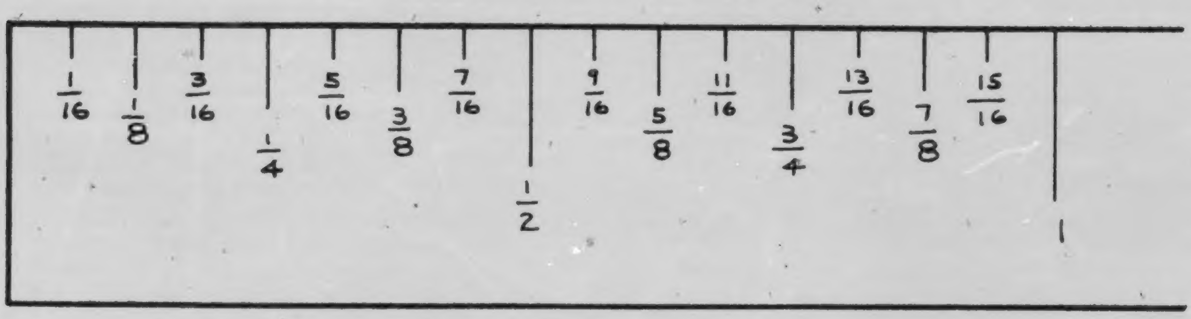


Now we are going to divide the quarters in half. These are called EIGHTHS.


1/8
1/4
3/8
1/2
5/8
3/4
7/8
1

There are 8 EIGHTHS in one inch. Count them. Write the number of eighths above each mark on the scale.

The smallest division we will use is the SIXTEENTH. This is written 1/16. The inch is now divided into 16 equal parts.


1/16
1/8
3/16
1/4
5/16
3/8
7/16
1/2
9/16
5/8
11/16
3/4
13/16
7/8
15/16
1

Count the sixteenths. Write the number of sixteenths above each mark on the scale.

To make the scale easier to read, the lines are different lengths. The longest line is for the 1/2, and the shortest is for the 1/16. Do you think you understand? Let's see.

ASSIGNMENT:

On the next page there are some lines to measure. Be careful. Be accurate. Think.

Now YOU draw some lines, using these lengths. Put each line under the length given.

1 1/2"

7 1/4"

6 1/8"

5 1/2"

3 3/4"

4 7/8"

2 1/8"

6 3/16"

4 7/16"

5 5/8"

3 15/16"

4 1/8"

5 3/4"

7 3/8"

7/16"

7/8"

3/4"

1 9/16"

1 7/16"

7 7/16"

5 1/8"

5 3/8"

5 5/8"

6 11/16"

4 1/16"

Now we can use the scale to measure a line. Good. Next, you will have to know how to find the middle of that line, or sheet, or drawing. Why? Because press sheets are usually run in the center of the press. The way to find the center is to divide by 2. Suppose we wanted to find the center of this sheet. First we measure it. It comes to 8 1/2".

$$8\frac{1}{2} \div 2 \quad = \quad \frac{17}{2} \div 2 \quad = \quad \frac{17}{2} \div \frac{2}{1}$$

$$(2\text{x}8 \quad = \quad 16 \qquad 16+1 \quad = \quad 17)$$

$$\frac{17}{2} \div \frac{2}{1} \quad = \quad \frac{17}{2} \times \frac{1}{2} \quad = \quad \frac{17}{4} \qquad \begin{array}{r} 4 \\ 4\overline{)\,17} \\ \underline{16} \\ 1 \end{array} \quad = \quad 4\ 1/4$$

This page is 11" long. What is the middle?

$$11 \div 2 \quad = \quad \frac{11}{2}$$

$$= \quad \begin{array}{r} 5 \\ 2\overline{)\,11} \\ \underline{10} \\ 1 \end{array} \quad = \quad 5\ 1/2$$

If we want to find the middle point of any measurement, or 1/2 of any number,
divide by 2

When a number has a fraction in it, some people find it easier to divide both parts of the number by 2 and add the two answers. For example,

$8\frac{1}{2} \div 2$ = WHAT?

(1) Divide 8 by 2: $\begin{array}{r} 4 \\ 2\overline{)8} \\ \underline{8} \end{array}$ = 4 Answer (1)

(2) Divide 1/2 by 2: $\frac{1}{2} \div 2 = \frac{1}{2} \times \frac{1}{2}$ = 1/4 Answer (2)
4 1/4 Whole answer

Try these problems.

1/2 of 10 ______

1/2 of $6\frac{1}{2}$ ______

1/2 of $10\frac{3}{4}$ ______

1/2 of 11 ______

1/2 of $8\frac{1}{4}$ ______

1/2 of $3\frac{1}{2}$ ______

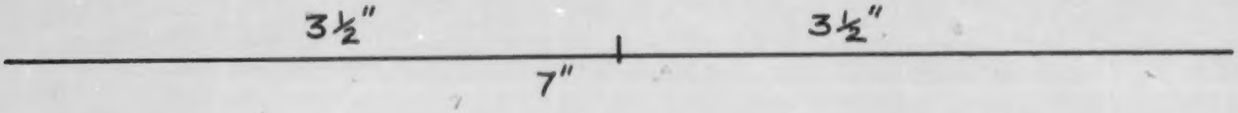
1/2 of 17 ______

1/2 of $5\frac{1}{2}$ ______

1/2 of 9 ______

1/2 of 25 ______

UNDER each line write the whole length. Find the center and make a mark. ABOVE the line write the number that is ½ of the length. Look at the sample.



ASSIGNMENT: Fill in the blanks

There are __________ sixteenths in one inch.

There are 8 eighths in ______ inch.

Mark True or False

__________ There are 4 quarters in one inch.

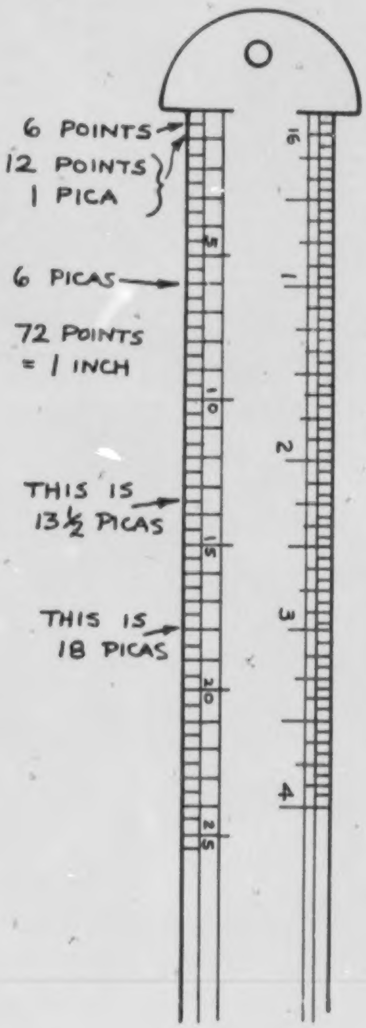
__________ There are 2 halves in one inch.

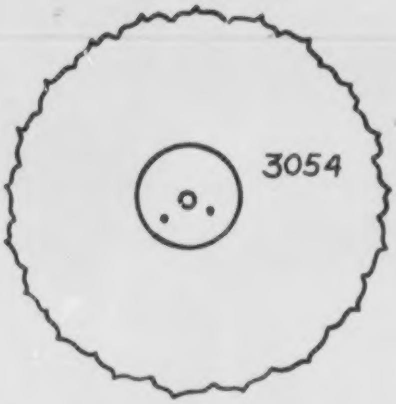
LESSON 3 – MEASUREMENTS – THE POINT SYSTEM

Look on the other side of the scale and you will see some different marks. They are called POINTS. These are a printer's way of marking and measuring.

12 points = 1 PICA
72 points = 1 inch
6 picas = 1 inch

This scale is a little easier to read than the inch scale – there are only POINTS and PICAS to worry about, no fractions of an inch.


6 POINTS
12 POINTS
1 PICA
6 PICAS
72 POINTS
= 1 INCH
THIS IS
13½ PICAS
THIS IS
18 PICAS
5
10
15
20
25
16
1
2
3
4



Remember the Headliner Typemaster? The first two numbers show the SIZE of the type in POINTS.

ASSIGNMENT: Write True or False in front of the sentence:

__________Printers use a special kind of measurement called the point system.

__________There are 12 points in one pica.

__________6 points are ½ of a pica.

__________The pica is the standard of measurement.

__________There are 6 picas in one inch.

__________There are 72 points in one inch.

Using the line gauge, draw lines accurately to the following lengths.

27 picas

12 picas

17 picas

6 picas

24 ½ picas

15 picas

1 pica

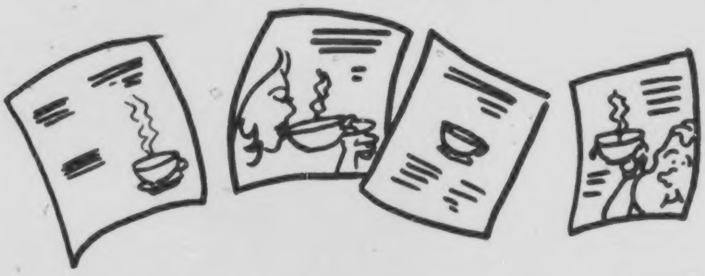
12 points

LESSON 4 – LAYOUT

A layout is a drawing showing how the different parts of a design are placed for printing.

There are four steps in making a layout.

1. THUMBNAIL SKETCH. This just means making several small drawings of different layout ideas. For example, here are four thumbnail sketches for an ad for coffee.



   The one that is the most pleasing is selected, and the next step – the rough layout, is made.

2. ROUGH LAYOUT. This is made to actual size. The pictures and drawings are done more accurately. The customer looks at this and makes changes that might help.

3. The third step is the COMPREHENSIVE, also made to actual size. The sizes and kinds of type to be used are marked. The size of the photo or drawing is marked.

4. The MECHANICAL is the fourth and last step. This has the paste-up of type. It is ready-for-camera copy. It is what the final printed sheet will look like.

ASSIGNMENT:

The four steps in making a layout are called:

(1)

(2)

(3)

(4)

LESSON 5 – TYPE FACES

There are hundreds of different type faces we can use in printing.

There are two main kinds – with SERIFS (ser′ ifs) and WITHOUT SERIFS. The type with serifs is usually called Roman, and the type without serifs is usually called Gothic.

BODONI 24 point

The above is an example of a Roman type named Bodoni. Notice the serifs. Also notice that the strokes are different sizes – thick and thin.

FUTURA 24 point

Above is an example of Gothic type named Futura. You see that it has no serifs and that all strokes are the same size.

Most type styles also come in a slanted form, called italic. Gothic type is usually used for headlines because it is easy to read.

ASSIGNMENT:

Cut samples of type from newspapers or magazines and paste below.

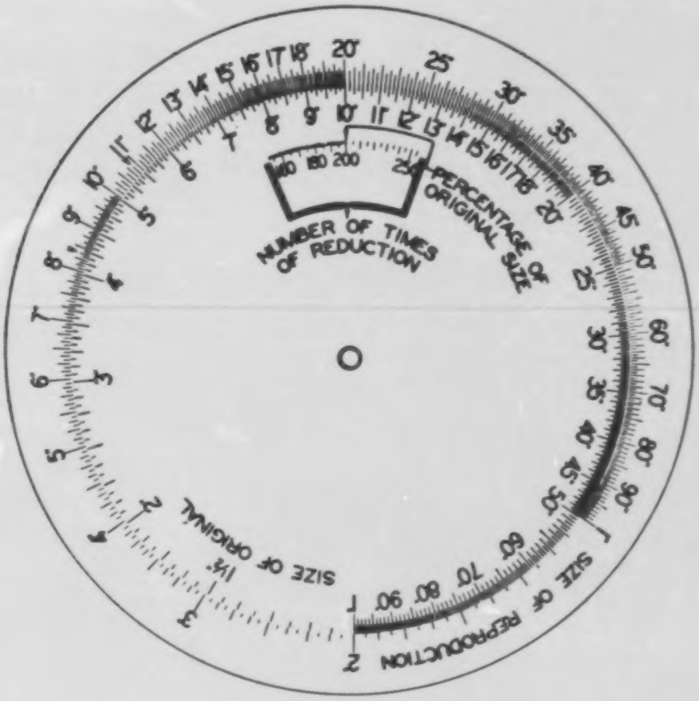
ROMAN GOTHIC

LESSON 6 – THE PROPORTIONAL SCALE

This lesson will teach you how to use the PROPORTIONAL SCALE.

Sometimes the picture, drawing, or type is too big or too small for the printed sheet. It must be enlarged or reduced.

Let's look at the tool called the PROPORTIONAL SCALE. This is a scale marked off in inches. The inches go round in a circle. Look again and you will see two scales. The inner scale turns.



NUMBER OF TIMES OF REDUCTION
PERCENTAGE OF ORIGINAL SIZE
SIZE OF ORIGINAL
SIZE OF REPRODUCTION

The outer scale is labeled size of REPRODUCTION, and the inner scale is labeled SIZE OF ORIGINAL.

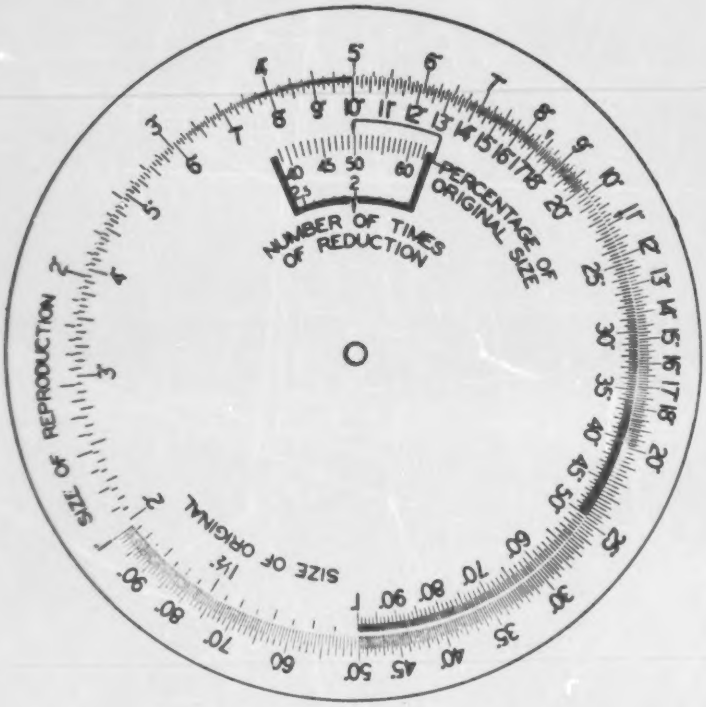
The picture or copy we are working with is the ORIGINAL COPY.

Turn the inner scale until the number 10" is under the 20" marking on the outer scale. Now look for the PERCENTAGE of ORIGINAL SIZE. If you have set the scale right it should read 200%. This means that 20" is 200% of 10" — twice as large.

The SIZE OF REPRODUCTION is the size we want it to be when it is printed. OK?

Say we have a picture that is 8" x 10" (ORIGINAL SIZE) but want to print it 4"x 5" (REPRODUCTION SIZE). We will use the larger of the two original dimensions, 10".

Move the scale so it looks like this: 5" over 10". (10" is the ORIGINAL SIZE and 5" is the REPRODUCTION SIZE.) 50% is the percentage we read off on the scale.


SIZE OF REPRODUCTION
SIZE OF ORIGINAL
PERCENTAGE OF ORIGINAL SIZE
NUMBER OF TIMES OF REDUCTION
40
45
50
60
2
2.5
1½

Again, if we have a headline that is 5″ long (ORIGINAL SIZE) and we want it to be 7″ long in the REPRODUCTION SIZE, we turn the scale until the 7″ on the OUTER scale is over the 5″ on the INNER scale. We see now that the percent is 140%.

ASSIGNMENT:

A. Use the PROPORTIONAL SCALE and write the % in the blank space. The first number is the ORIGINAL SIZE and the second number is the REPRODUCTION SIZE.

1. Enlarge 7″ to 10″______%
2. Reduce 4″ to 2″______%
3. Reduce 5″ to 1″______%
4. Reduce 9″ to 4″______%
5. Reduce 10″ to 5″______%
6. Enlarge 8″ to 10″______%
7. Reduce 6″ to 2″ ______%
8. Enlarge 5″ to 6″______%
9. Enlarge 4″ to 6″______%
10 Reduce 8″ to 3″______%

Check your answers. If the second number is larger than the first, the answer MUST be more than 100%. OK?

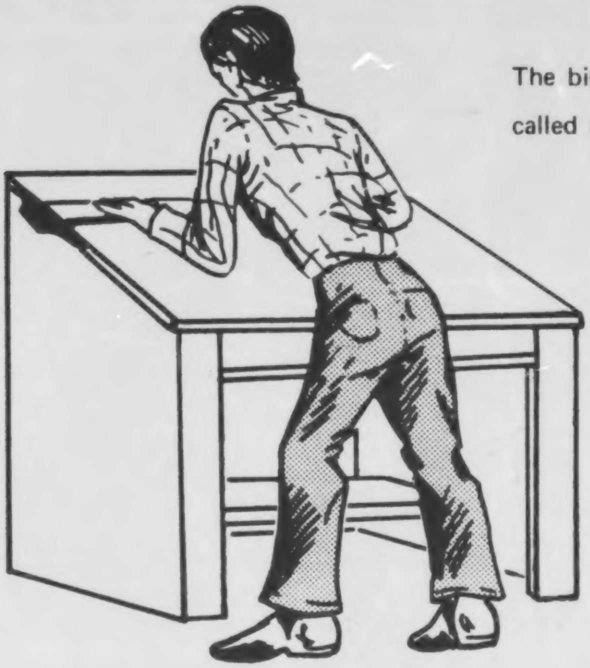
B. Try some more.

1. Reduce 8½″ to 4¼″______%
2. Reduce 8″ to 7½″______%
3. Enlarge 5½″ to 6″______%
4. Reduce 4″ to 3″ ______%
5. Enlarge 4″ to 7½″______%
6. Reduce 3″ to 2½″______%
7. Reduce 5″ to 3″ ______%
8. Enlarge 6″ to 7″______%
9. Reduce 36″ to 18″______%
10. Reduce 30″ to 12″______%

C. Fill in the blanks:

The inner scale is the____________________size.

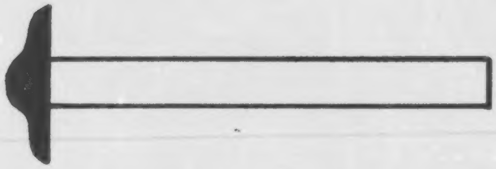
The ____________________scale is the size of the reproduction.



The biggest tool we will be using is called a LIGHT TABLE.

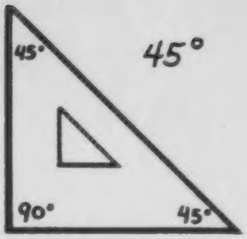
This is the "work bench" of the layout man. It has a frosted glass top and a light inside.

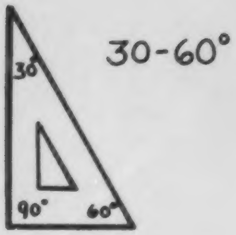
This man is using a T-SQUARE. It is used to line up copy, so it is straight.



The T-SQUARE is the tool you will use to keep your copy lined up straight, and to draw lines. If it falls to the floor it will no longer be accurate. Be careful.

To draw a line from side to side (horizontal), hold the T-square firmly against the left side of the light table so that it does not move. To draw a line from top to bottom (vertical), move the tool around to the front of the table. Always use the same edge of the blade for more accuracy.

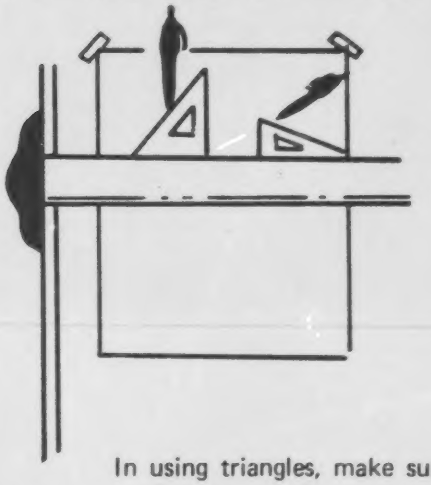


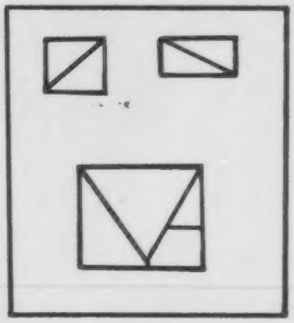


There are two shapes of TRIANGLES. They are usually made of clear plastic. "Tri" means three.

There are three angles in each triangle. There is one right angle (90 degrees) in each. This is a square corner. The triangle on the left is called a 45-degree triangle. Both small angles are the same – half a right angle. The other is a 30-60 triangle. The small angles are different.

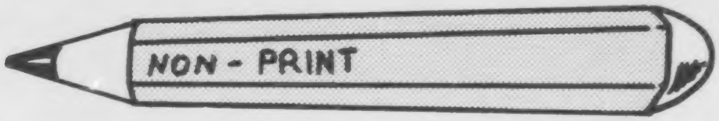
The triangles are used with the T-square to make square corners and to draw straight lines at angles of 30, 60, or 45 degrees.



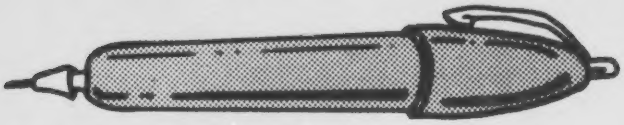


In using triangles, make sure you hold them tightly against the blade of the T-square, so they do not move.

Let's take a look at some of the other tools used in layout work.

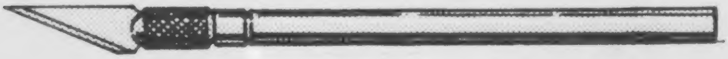


This pencil has a blue lead and is used for lines that do not print.



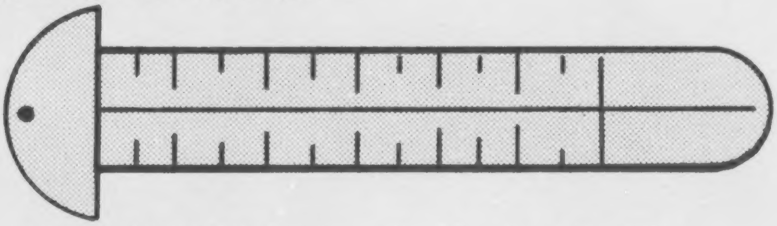
Technical pen filled with black ink. Used for drawing lines that will print.

A very commonly used tool is the EXACTO knife. The blades can be replaced when needed.

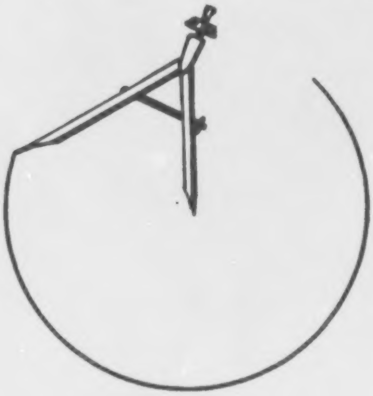


Two things about the knife. First, it is used only for cutting paper, film, or artwork. It should stay on the light table — you can't afford the time to look all over the shop for tools. The second thing is that it is a tool, not a toy; it must be kept sharp or sloppy work will result.

Scissors are used only for cutting paper or film. They too must be kept sharp to do a good job.

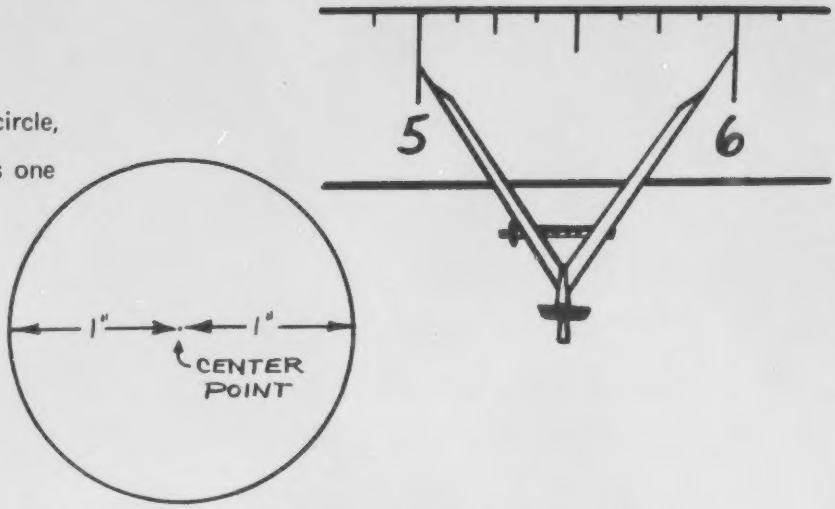


And. . . our old friend, the LINE GAUGE tells us where to draw the lines.



And a COMPASS. This has one steel point and one lead point. It is used to draw a circle.

If we want a 2" circle, we put the points one inch apart.



The best way to paste up layout materials is with the WAX COATER. Two things about the wax coater:

1. Keep the large roller clean. Do not start the machine until the wax is hot and melted; this will keep wax from building up on the roller.

2. Always put copy into the machine with the printing showing. That way wax will not get on the front of your paper or artwork.

ASSIGNMENT: Draw a circle around the right word:

The (triangle) (line gauge) (T-square) is the tool used for measuring.

A (compass) (line gauge) (non-print pencil) is used for drawing guidelines we do not want to print.

The (compass) (line gauge) (triangle) is used to draw circles.

The tool used to keep copy lined up straight is the (wax coater) (T-square) (Exacto knife).

The wax coater must be (cold) (hot) before you use it.

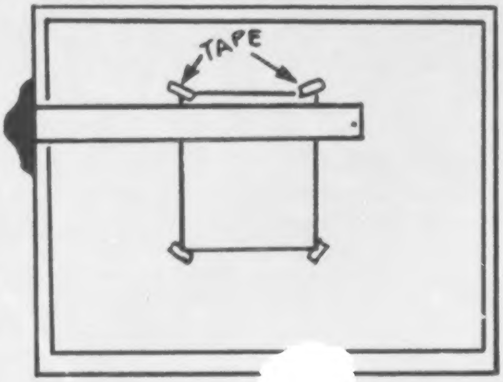
Put copy into the wax coater with the printing (up) (down) (either way).

Get some paper, tape it to the table, and practice drawing horizontal, vertical, and slanted lines.

Using pictures and charts from magazines, practice lining them up straight on your paper and pasting them down.

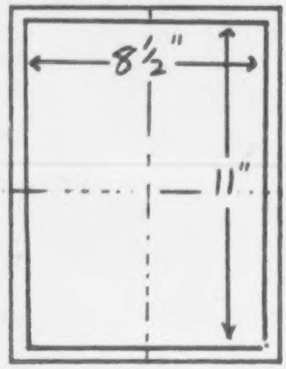
LESSON 8 – PASTE-UP

Get a piece of 9" x 12" paper and place it on the table as shown in the drawing. Use a piece of masking tape and place over one corner. Good. Now use the T-square and make the paper even with the top edge of the square. Tape the other 3 corners.



Now – draw a center line from top to bottom and from side to side. Use the line gauge and blue pencil.

Use the center lines and draw a box 8½"x 11" in the center of the paper. Use the blue pencil.

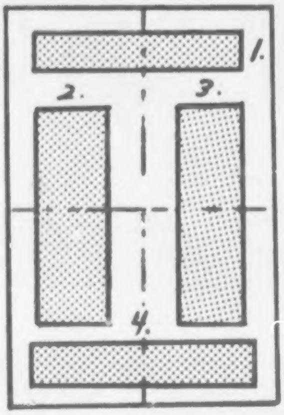


Is it in the center? If not, go back to lesson 2, page 50 and go over the lesson. Now try again.

The 8½" x 11" box shows us the size of the sheet to be printed.

Now get a sheet of colored paper and cut one piece 6" long and 1" high. Use a metal straight-edge and Exacto knife for cutting. Cut two pieces 14 picas wide and 32 picas long. Cut one more piece 1½" high and 6" long. Follow the directions on the next page. When you finish the paste-up, it should look like this.

Take your time. Measure accurately. You can do it!



This is also a lesson in FOLLOWING DIRECTIONS. That is one of the most important things anyone can learn. Take your time. Do one thing at a time, and you will not have any trouble.

1. Using the line gauge, measure down from the top of the sheet 5 picas. Make a mark and draw a line. Use the blue pencil.

2. From THAT line measure down 6 picas and draw a line. That is where the first piece of colored paper will be pasted.

3. Measure down 4 picas from that line and draw a line.

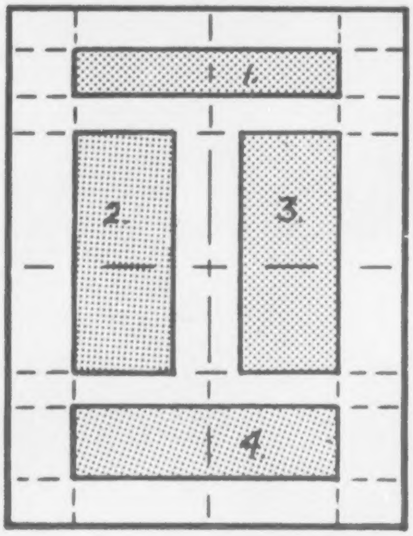
4. Measure down from that line 32 picas and draw a line.

5. Measure down 4 picas and draw a line.

6. Measure 9 picas from this line and draw a line.

These lines tell us where to place the papers from top to bottom. Now we have to find where they go from side to side.

7. Measure 3" to the left and 3" to the right of the center line. Draw lines the FULL length of the sheet.



Now you know where to place the larger pieces of colored paper.

Put the papers through the wax coater machine. Use the T-square and paste the papers down.

Good. Now, cut some more colored paper – 5 pieces.

1. 6 picas x 36 picas
2. 9 picas x 42 picas
3. 6 picas x 24 picas
4. and 5. Two pieces, each 12 picas x 18 picas.

Tape a piece of 8½" x 11" white paper to the light table.

Find the center and draw a line from top to bottom. Use blue pencil.

Follow the drawing for the measurements.

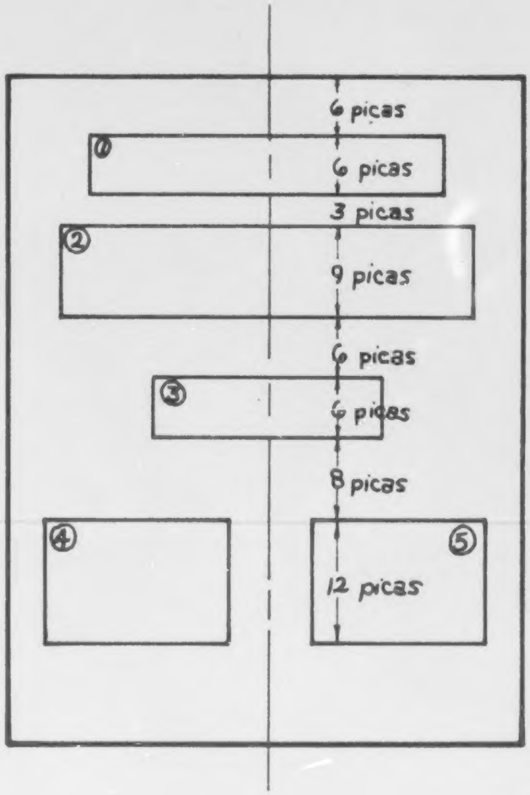
All measurements are in picas.

First 3 must be centered, left to right.

Last 2 pieces must be centered in the half-sheet.

Draw light lines with blue pencil.

Paste the colored papers on sheet. Put your name at the top.



Be careful of your tools. A T square with nicks on the edge will make all your lines look like ——————————.

Triangles are made of plastic and will break if not used carefully.

ASSIGNMENT:

Your teacher will give you some pictures and typed copy. You will make your own layout and paste it up.

UNIT V

STRIPPING

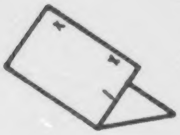
LESSON 1 – MAKING A DUMMY

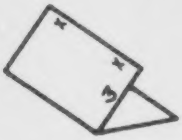
At the end of this lesson you will make three different dummies. A dummy is something a printer needs when he is printing a booklet or magazine. It keeps the pages in order. Page 5 must come after page 4 and not before it. The only way to be sure of this is to make a dummy.

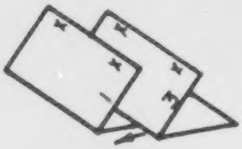
First thing we need to know is how many pages we are to print. For now we will say 8 pages.

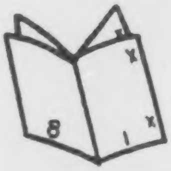
On the duplicator we can print 2 pages on each side of the sheet: 2 on one side and 2 on the other makes 4 pages on one sheet. want 8 pages. That means we will need 2 sheets of paper for each booklet.

Get two blank pieces of paper and fold them in half.





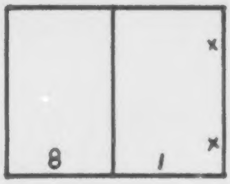


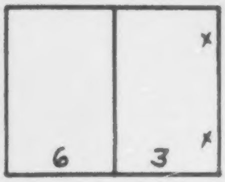


Good. Now put one inside the other – like this.

Write 1 on the first page, turn it over and write 2 on the back. Write 3 on the next, turn it over and write 4. Keep on like this until you have finished. The last page should be 8.

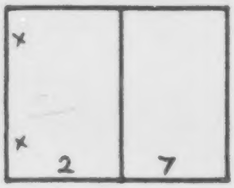
This is what the sheets will look like on one side.

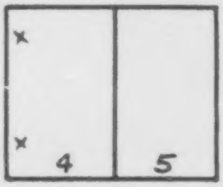


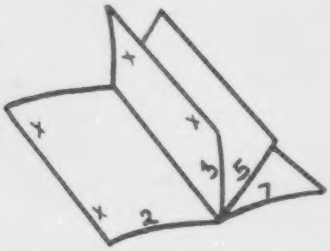


Mark two x's on the right-hand end of each sheet. This is the GRIPPER end. It goes in the press first. This is important.

When the sheets are turned over, they will look like this. Mark the gripper with two x's.







Put a staple in the fold so the dummy will stay together. After one side of a sheet is printed, make a check mark on the dummy to show it is finished.

Always check to see which end of the sheet goes into the press first. It is the GRIPPER end. The one with the x marks on it.

If there are 12 pages to be printed, you will need 3 sheets. How many sheets will you need for 16 pages?

ASSIGNMENT: Mark True or False:

__________A dummy is a printer's aid when more than two pages are to be printed.

Make an 8-page dummy.

Make a 12-page dummy.

Make a 16-page dummy.

LESSON 2 – STRIPPING A FLAT

At the end of this lesson you will strip a flat.

Words to learn:

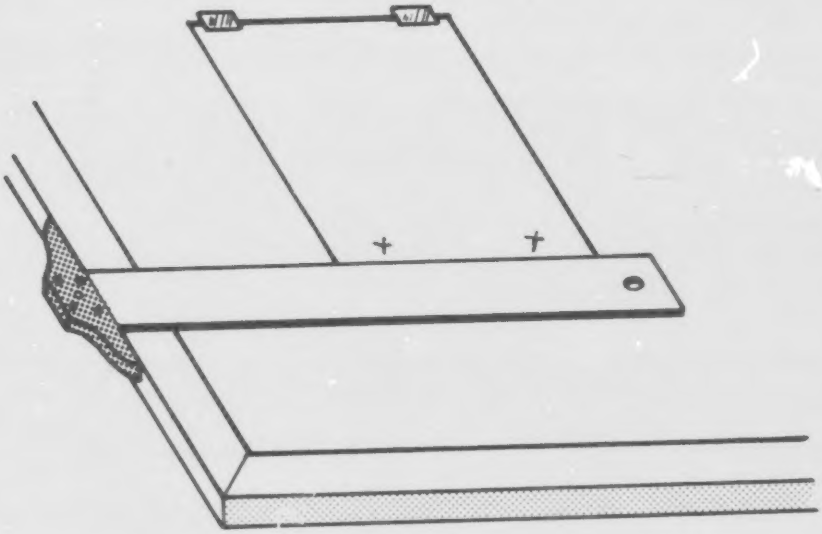
STRIP – To tape negatives in their proper places on a piece of masking paper (goldenrod) and to uncover the parts to be printed.

NEGATIVE (neg' a tive) – Piece of film from camera that has been exposed, developed, and fixed.

GOLDENROD (gold' en rod) – Name of special yellow paper used for masking or stripping.

FLAT – Goldenrod paper with a negative or negatives taped in place.

GRIPPER END – The end of sheet that goes into the gripper fingers of the press. The first end into the press.

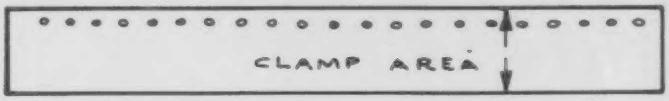


Stripping is done on the light table.

Line up bottom edge of goldenrod with top edge of T square.

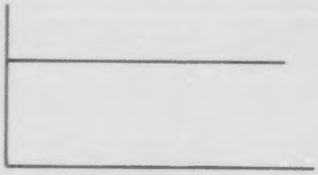
Fasten goldenrod to glass with tape.

The bottom edge of the goldenrod is the gripper end. Mark 2 x's here. Later, a plate will be made from this flat, and the plate will go on the press with the gripper end first.

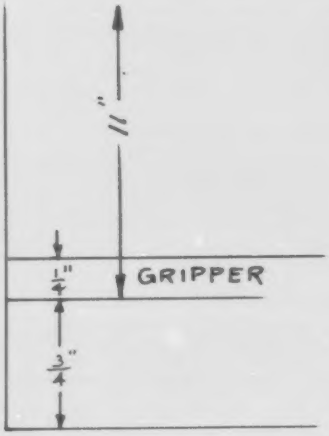


The holes in the ends of paper masters and plates fit over pins on the press. The ¾" at the top is needed to fasten the plate to the plate cylinder on the press. This area cannot be used for stripping anything that will be printed.

Measure ¾" from the bottom of the goldenrod and draw a line. Like this.

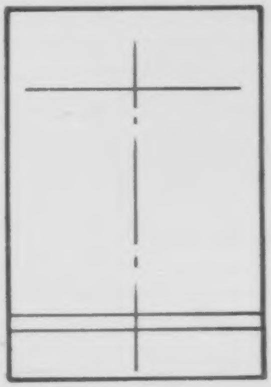


The metal fingers on the press that pull the sheet through the press take another ¼". Measure ¼" from the line you just made and draw another line. This is called the GRIPPER AREA.



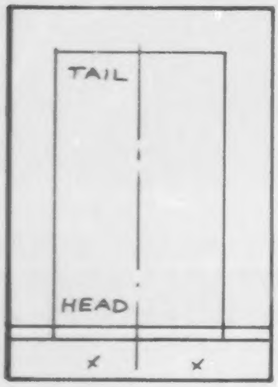
Now the goldenrod looks like this. We can't use the ¼" area for printing either. That is why we draw the second line.

Measure 11" up from the first line. This is the end of the sheet (8½ x 11).



Find the center of the goldenrod and draw a center line from top to bottom.

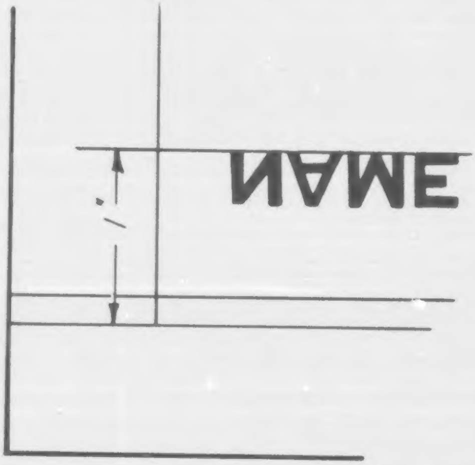
Center the 8½" sheet on the goldenrod.

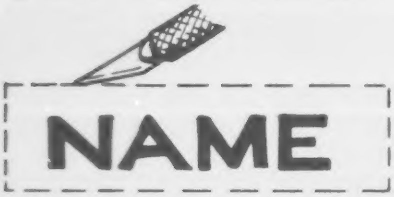


Get a negative of the name of your school. It should be one line, and fit on the sheet.

We strip upside down and backward. The top, or head of the sheet is now at the bottom, at the gripper area. This is called the HEAD of the sheet. The other end is the TAIL. The HEAD end of the sheet starts at the first line you made – the end of the clamp area.

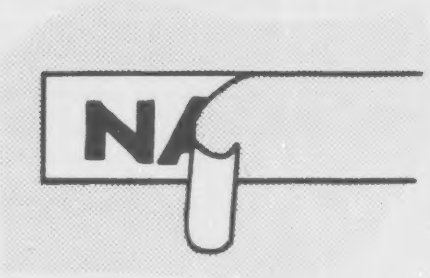
Measure back from this line 1" and draw a line. This is the line that the name of your school will sit on. Put the negative on the line, using the T-square to make it straight. Tape it down to the goldenrod. Center it! Good. Take the goldenrod up from the light table and turn it over. With the light on you can see the name on the negative through the goldenrod.





Use a stripping knive and cut the goldenrod. Cut about 1/8" away from the image.

Lift out the cut part of the goldenrod.



Now your flat is almost finished. The stripping is done.

Now look at the negative again. Do you see any small holes or scratches?

These must be covered up so they will not print.

This operation is called OPAQUING. It is called that because the name of the ink-like material used is called OPAQUE. The word "opaque" means not letting light through. It is usually black, sometimes orange. Get a small brush and dip it in some opaque and cover the holes. If you get any on the lettering be sure to wipe it off, or the letter will not print. Clean the brush when you are done. Tighten the cap on the bottle so it will not dry out.

ASSIGNMENT: Mark True or False:

__________A flat is a piece of goldenrod with a negative taped on in the right place.

__________The gripper end of the sheet is the end that goes in the press first.

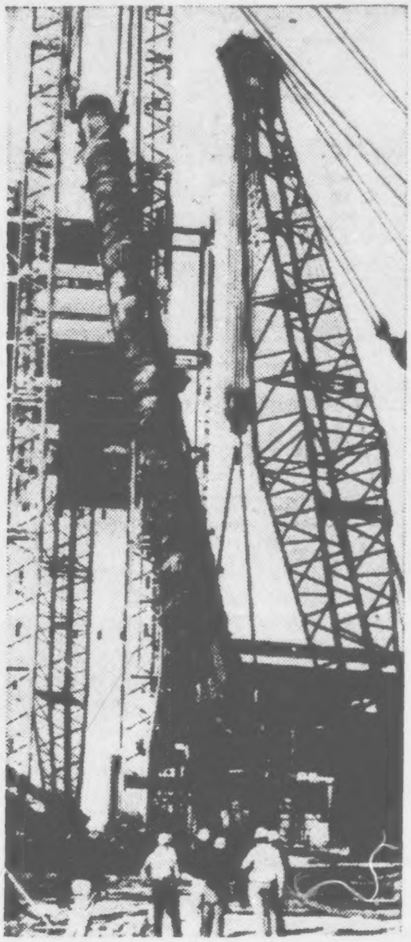
__________Stripping is taping negatives to the goldenrod using a light table, and then cutting the goldenrod away from the parts to be printed.

Strip one of the slogans or captions you produced on the Headliner or Strip Printer.

LESSON 3 – STRIPPING A HALFTONE AND A LINE NEGATIVE USING TWO FLATS

At the end of this lesson you will strip two flats to be made into a single plate.

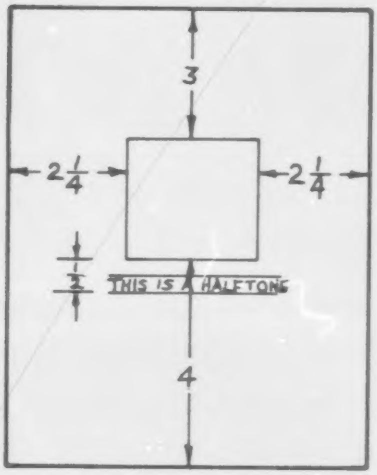
Words to learn:



HALFTONE – A negative of a photograph. The camera operator uses the same kind of film as for a LINE negative. The negative you just stripped was a LINE negative. Before exposing the film, the camera operator puts a halftone screen over the film. This is a special piece of film with dots on it. It breaks up the light coming from the photograph into dots of light. The negative will have small black dots where the photo is dark and small white dots where the photo is light. It is these dots that are printed.

The word "halftone" is also used for the picture that is printed from a halftone negative. The picture will be made up of large and small dots.

Look at this picture from a newspaper. See the different size dots? The newspaper must use a coarse screen with large-size dots because of the rough paper. Look in a magazine with coated paper and you will see pictures made with a much finer screen. You will need a magnifying glass to see the dots.



Lay out an 8½"x 11" sheet on a piece of goldenrod. Forget how? Go back to lesson 2.

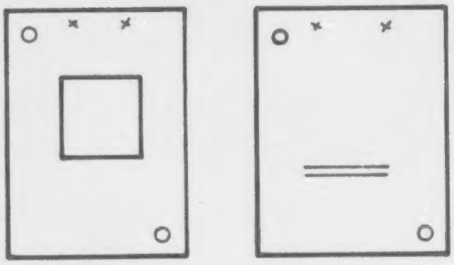
Draw a 4" square box like the sample. Follow the dimensions.

Set on the headliner: This Is a Halftone. Get a line negative of it.

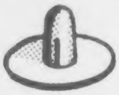
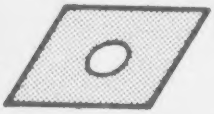
Also get a halftone negative that is large enough to cover the square. Lay both negatives aside for a while.

The halftone and the line negative will need two separate flats. Two flats are easier to strip than one.

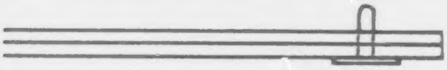
Tape another piece of goldenrod right on top of the first one. Measure ½" from bottom of halftone square and draw a line for the line negative. We call this a CAPTION. It is type that tells something about the picture.



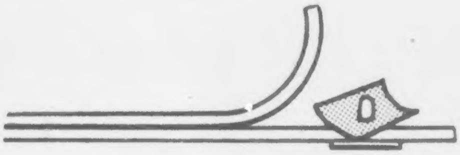
These two flats must have some way that they can be kept in REGISTER (exactly matching) when you make the plate. To do this job we use

register pins  and fitters. 

At two opposite corners, cut a hole in both flats, big enough for the pins to fit into. Cut both flats at the same time.

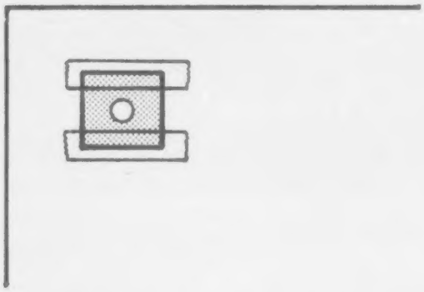


Put the pin in the hole.



Lift the top flat and put a fitter on the pin. Tape it to the goldenrod.

Put the top flat over the pin and tape a fitter to that flat. Do the same to the other corner. Then take the pins out.



Now you will strip the line negative that goes under the halftone. Center the line on the halftone. Tape it to the flat.

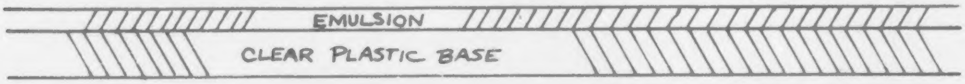
Take flat up, turn it over, cut away the goldenrod. Opaque the negative.

Now take the other piece of goldenrod.

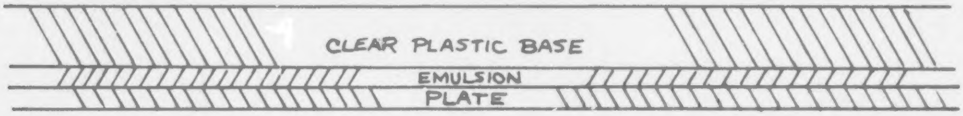
Put an old piece of film under the flat. This keeps you from cutting scratches in the glass. Use a stripping knife and a metal straightedge and cut the goldenrod on the lines. Be careful to stop at the corners. Make sure that the sides are square. Better use a T-square, and tape the flat to the table until you are more experienced.

O.K. Now check the cut. Straight? No rough spots? Neat corners? Good. You are ready to tape the halftone in place.

Which side of the film goes up and which goes down? There is an easy way to tell. If there is any lettering, like a sign, we would know to put the type upside down. Where there is no lettering, we scratch the EMULSION. That's a new word. Here is what it means.



The emulsion is the part of the film that has the image in it. It is very thin. When you make the plate, the emulsion must be next to the plate.



Use a knife and scratch the negative near the edge, where it will not print. If you scratch the BASE side, nothing will show. Turn the negative over and scratch again. Now you can see where you scratched. THAT is the side that goes UP when you tape the negative to the flat. Make it a habit to always check a halftone that way before you make a plate.

Now tape the halftone to the goldenrod, in the space cut out for it.

ASSIGNMENT: Write True or False in the blanks.

__________Register pins and fitters are used to register two or more flats.

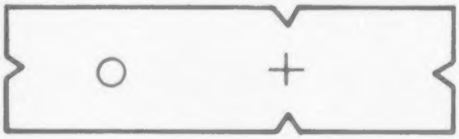
__________A halftone is a negative made up of different sized dots; it is used to print photographs.

Using the same halftone and caption, strip them for a 6" x 9" sheet.

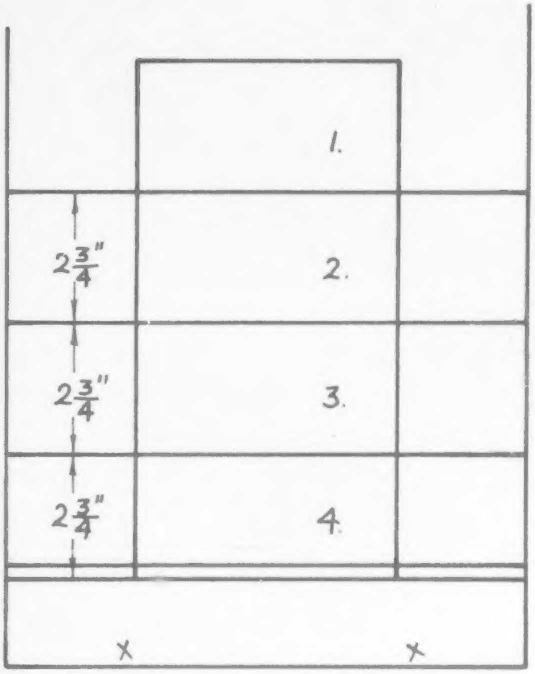
LESSON 4 – STEP AND REPEAT

If you had to print many copies of some small form and had only one negative, you would strip the negative to get more than one image on the plate. That is called STEP AND REPEAT.

You use the same register pin but a different fitter. The notches are for lining it up with layout lines on the flat. Lay out an 8½" x 11" sheet on the goldenrod. We are going to print a form 8½" x 2¾".



You can get 4 of these out of one 8½" x 11" sheet.

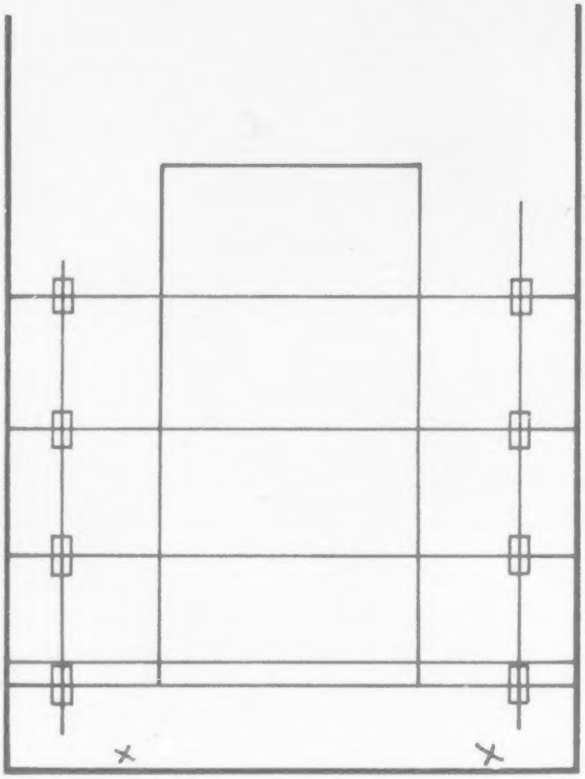


Measure from the gripper edge of the sheet 2¾" and draw a line.

Measure 2¾" from this and draw another line.

Measure 2¾" from this and draw one more.

Draw these lines all across the flat.

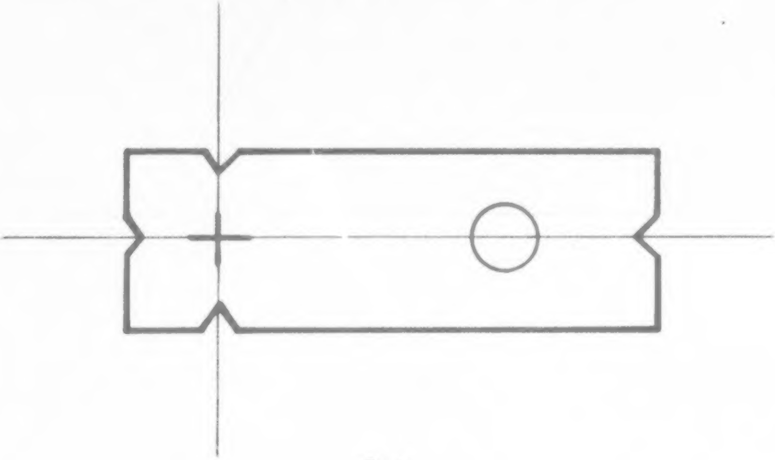


About 1" from each side of the flat, draw two lines as long as the sheet.

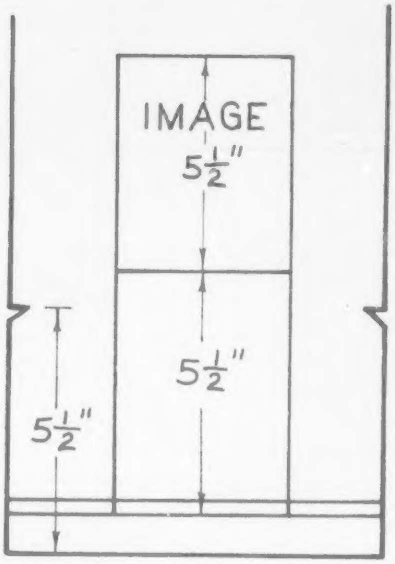
Where these two lines cross the three lines you just drew, put the fitters. The first goes on the gripper edge of the sheet.

Tape the image in the center of the first panel. Turn flat over. Cut away the goldenrod so you can see the image. Also cut 8 holes in the goldenrod so the pin will fit the fitters. Flat is now finished. Save it. Put your name on it. You will make the plate later on.

This is the most accurate way to strip STEP AND REPEAT.



There is another, quick way that is used sometimes.



If you have only two steps to make, measure the first step distance – 5½" from the bottom edge of the flat. Use a T square to draw a line across the flat. Use a knife and cut a notch, as shown here. Strip the image in the second panel, as shown.

ASSIGNMENT: Fill in the blanks:

___________and ___________is the name of the flat that uses one negative to print more than one image on a plate.

Write True or False.

The most accurate way to strip more than one image is with register pins and fitters.

UNIT VI

PLATEMAKING

LESSON 1 – BURNING AN ALUMINUM PRESENSITIZED PLATE

Words to learn:

BURN – BURNING – Another way of saying expose a plate.

VACUUM FRAME (Vac′ u um) – Machine with a glass frame and a vacuum pump, used to expose plates.

At the end of the lesson you will burn a plate.

Plates come packed 100 or 50 in a box. They are wrapped in foil very carefully to keep the light off. If light hits them they will be exposed, just like a piece of film or photographic paper. Be careful when you take a plate out of the box. Wrap up the rest of the plates again in the foil.

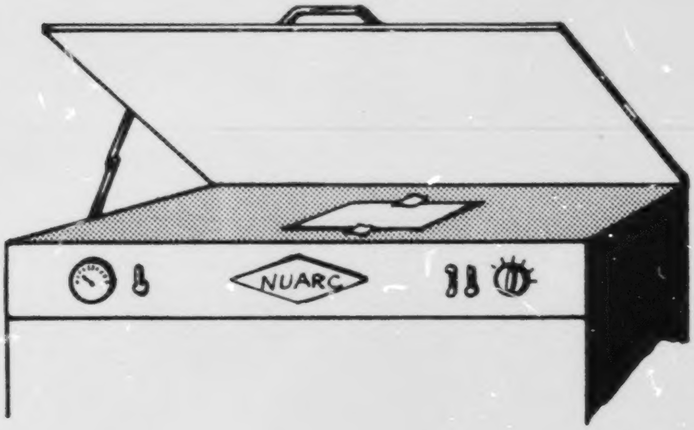
Hold the plate by the edges. Fingerprints can spoil the plate. Do not bend the plate. It is very thin and may wrinkle.

Have an empty plate box handy when you take the plate out of the box. The only time the plate should be in the light is when it is in the vacuum frame. The empty box makes it easy to carry the plate to the vacuum frame.

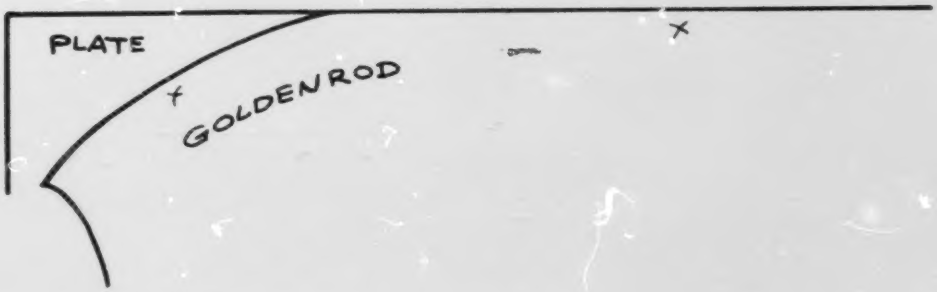
Most vacuum frames use CARBON ARCS for the light that exposes the plate. This is the same kind of light that comes from an ARC WELDER, and if you look at it you will have very sore eyes for several days.

When you push the exposure button you must turn away until the time is up.

The vacuum frame has a glass cover that is hinged.



Raise the glass and put the plate on the rubber mat. Tape it down. Put the tape on the edge of the plate, just enough on the plate to hold it. Work quickly so that the plate is not exposed. Put the flat on top.

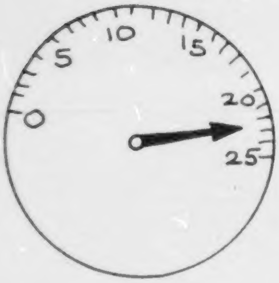


The gripper edge of the flat MUST be lined up with the end of the plate. This saves MUCH time and trouble for the press operator.

When flat is in place, put piece of tape on each edge. This keeps it from moving when you put the glass cover down.

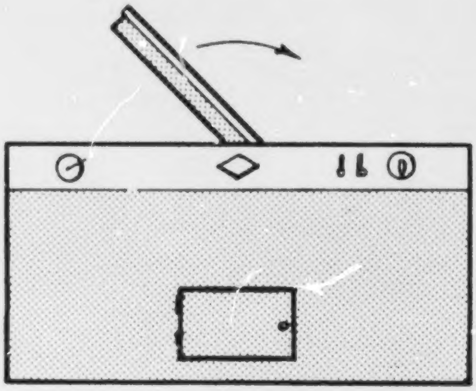
Wipe off flat. Make sure there is no dirt that will cover up any copy.

Wipe off glass on both sides.



Close cover and lock it tight. Turn on vacuum pump and wait for needle to get to 22 on scale at least. Look at the flat and see if it has moved. Also look for dirt on the flat or glass.

Release the latch and turn the glass side so it is facing the floor. Latch in place. Set the automatic timer for 4 minutes. This turns on the arc light inside the machine and exposes the plate. At the end of 4 minutes the light will go off.



Release the latch and swing the glass side up again. Turn off the vacuum pump. You will have to wait for a couple of minutes for the vacuum to release the glass. Open the glass and take the flat and plate out. Put plate back in box so the light from the room will not spoil it.

Close the glass. Lock it. Turn glass to the down position again so nothing will break it while machine is not being used.

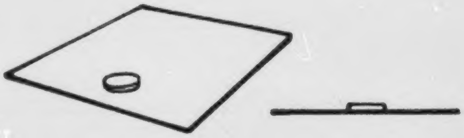
ASSIGNMENT:

Using the flat you made of a halftone and a caption, burn in an aluminum plate, following the above instructions.

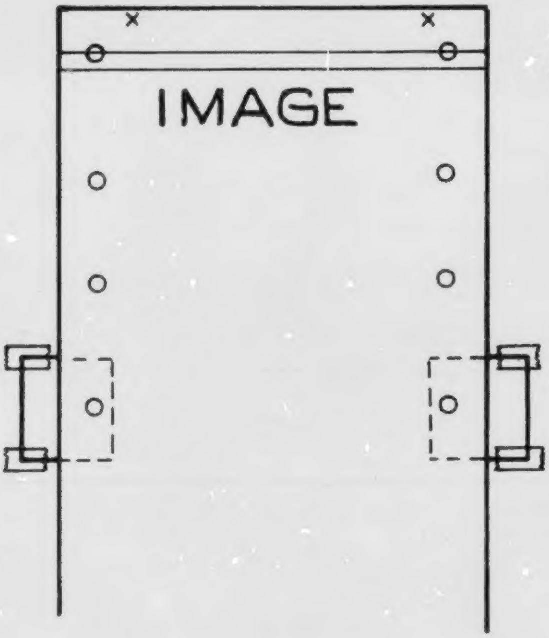
Let's take the flat you stripped for step-and-repeat. The one with the register fitters.

The register pin you used on the light table is too high to fit under the glass of the platemaker.

So . . . we use a different kind. This is made of a flat piece of metal about 2" x 1½". Instead of a pin it has a little button, about 1/16" high. This will fit under the glass.



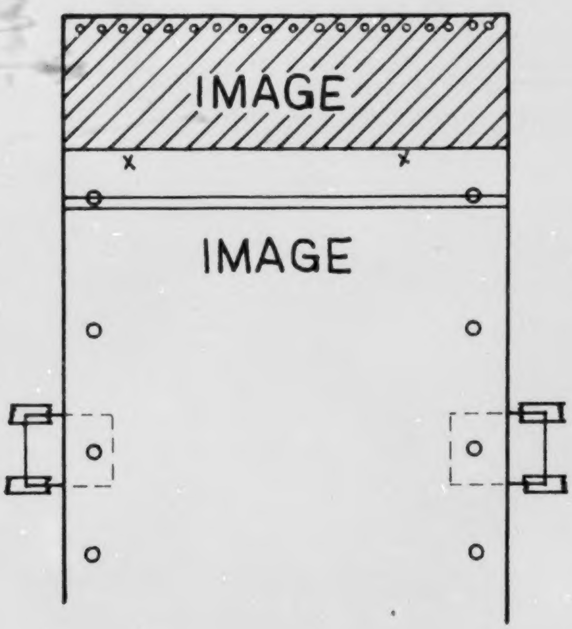
Tape the plate to the mat in the vacuum frame. Place the flat in position and tape down.



Slide one of the register plates (shown above) under the flat and put it in the hole farthest away from the gripper. Put one on each side. Tape them to the PLATE. Make sure they fit into the holes in the fitters. Push down hard.

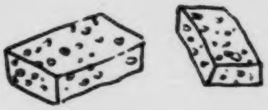
Make the first exposure. Swing the glass back up and open up. For the next exposure, move the flat AWAY from the gripper edge of the plate and fit the next pair of fitters on the buttons. You see that part of the plate is now uncovered. Put another piece of goldenrod over the plate. Just lay it there. Close the glass cover, turn it down, and make the next exposure. Repeat this until all fitters have been used. Four burns. Be sure to keep the plate covered each time.

The reason you can't see the image on the plate is because it is not visible until it is developed. This is called a LATENT image. Like a LATENT image of a good worker. It is there, but it must be developed!

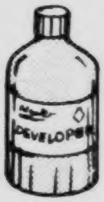


LESSON 2 – DEVELOPING THE PRESENSITIZED ALUMINUM PLATE

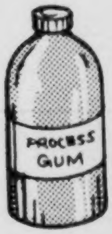
At the end of this lesson you will develop a plate.



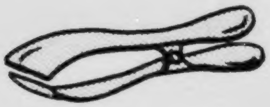
2 sponges



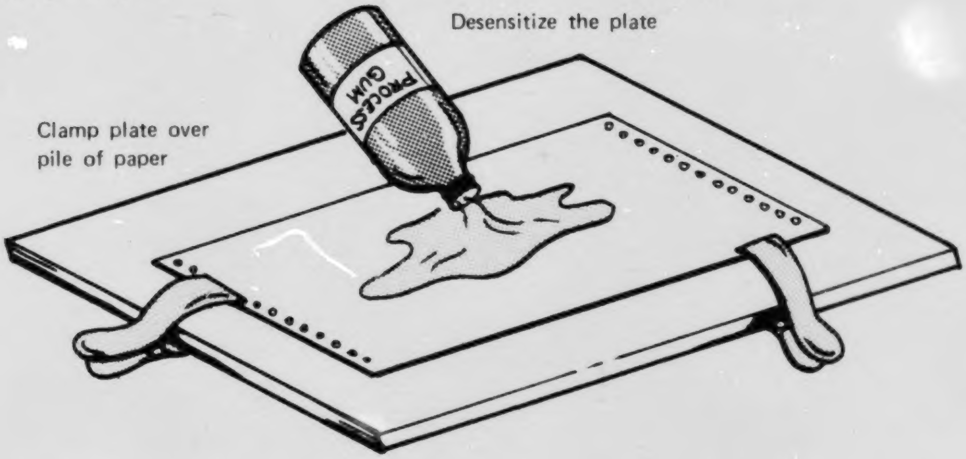
Developer



Process gum



2 spring clamps



Desensitize the plate

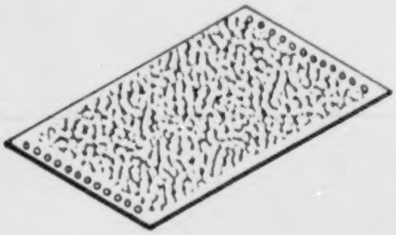
Clamp plate over pile of paper

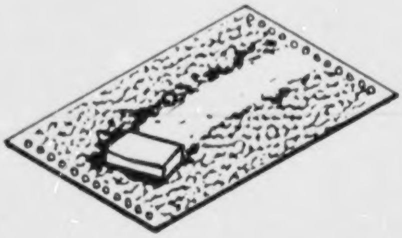
Each sponge should be in its own container of water.

Pour PROCESS GUM on plate. Squeeze water out of sponge and scrub the plate. Cover the whole plate, but don't rub hard. Go back and forth, both ways.

Be careful of your eyes. Do not splash any of the chemicals into your eyes.

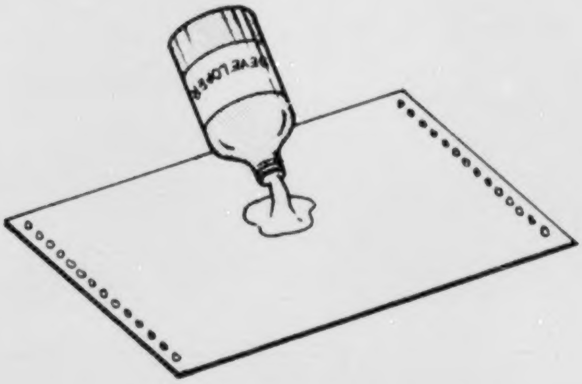
When surface is foamy all over, stop, and with the sponge remove some of the foam. This 'desensitizer' removes the part of the coating that was not exposed to the arc lights.





Squeeze the sponge and take off some of the foam.

Leave a thin film or coating. Plate must not dry out. Put sponge back in its container. Take out sponge from second container and squeeze water out.

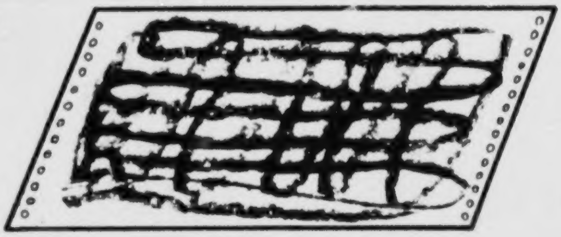


Pick up DEVELOPER bottle and shake.

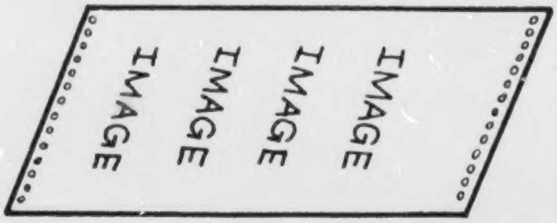
Pour about a 2" circle of developer on plate. Scrub with sponge.

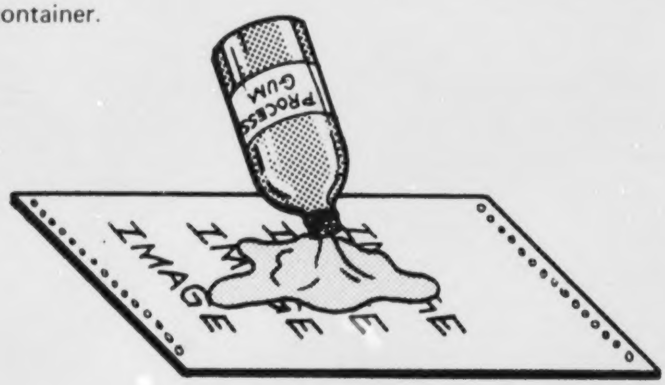
Cover the whole surface by going back and forth.

Use firm pressure, but not too hard.



Keep on until you see the image appear. When the image becomes a strong red color you are finished developing. Sponge off the developer that is left on the plate. Put sponge back in container.





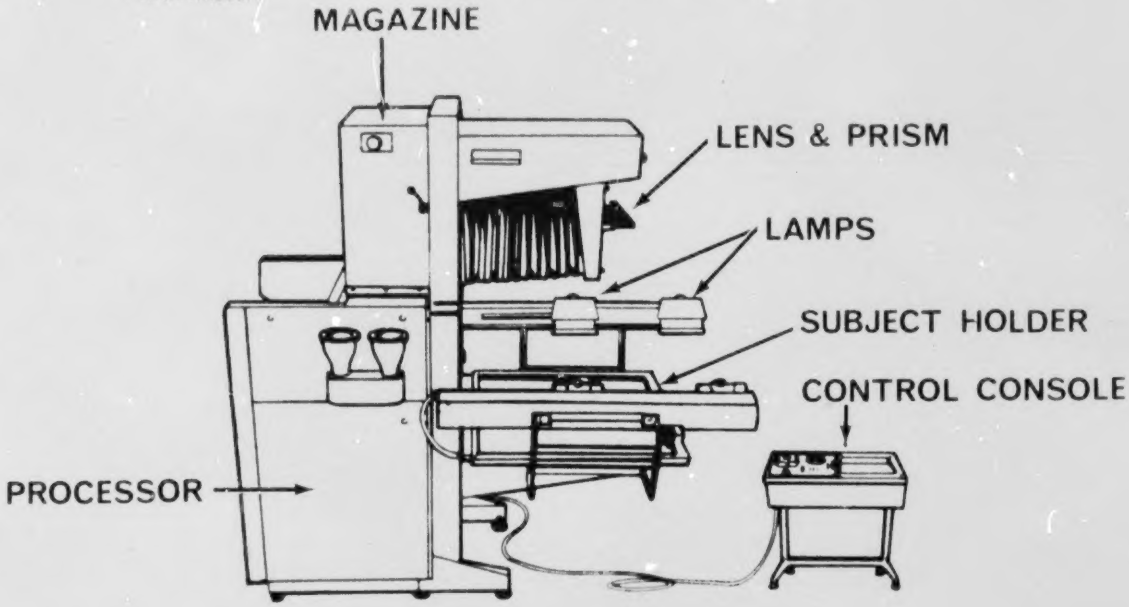
Pour some process gum on plate and rub lightly until plate is dry, using a paper towel. Plate is now ready for the press.

ASSIGNMENT:

Practice redeveloping an old plate first. This will give you the 'feel' of the job. Then you can go on and develop a plate.

LESSON 3 – ITEK PLATEMASTER

At the end of this section you will be able to load the plate roll, fill the machine with chemicals, and make a good plate on the Itek Platemaster.


MAGAZINE
LENS & PRISM
LAMPS
SUBJECT HOLDER
CONTROL CONSOLE
PROCESSOR

The ITEK PLATEMASTER was invented for the in-plant print shop. With this machine, we do not need:

- A darkroom
- A camera
- A stripper
- A platemaking department

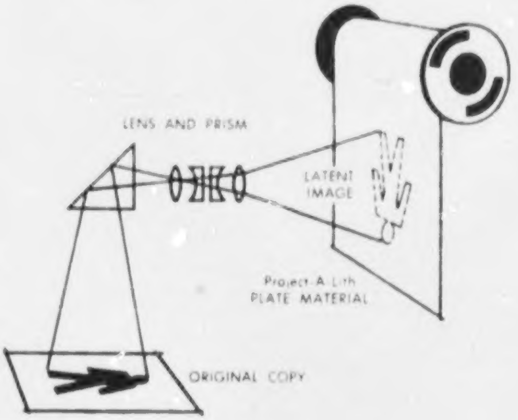
The Itek does it all. "Itek" is the name of the company that makes it. It can do any platemaking except halftones.

You put the copy you want to print on the copy board. It is copied on a special plate material. The plate is automatically cut, developed, and fixed, and comes out of the machine ready to print on the press.

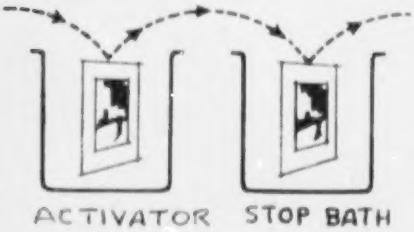
The special plate material comes in 100-foot rolls and is stored inside the machine. The name of this material is Project-A-Lith.

Here is how it works.

When you push the exposure button, a shutter opens and the original copy is reflected through the lens and onto the plate — just about like your own camera.


LENS AND PRISM
LATENT IMAGE
Project-A-Lith PLATE MATERIAL
ORIGINAL COPY

After exposure, the machine cuts off the exposed piece of plate and sends it to the developer tank to be developed. After it is developed it goes into the stopbath solution in the next tank.


ACTIVATOR
STOP BATH

In about a minute, the finished plate comes out of the back of the machine. It is now ready to put on the press and run.

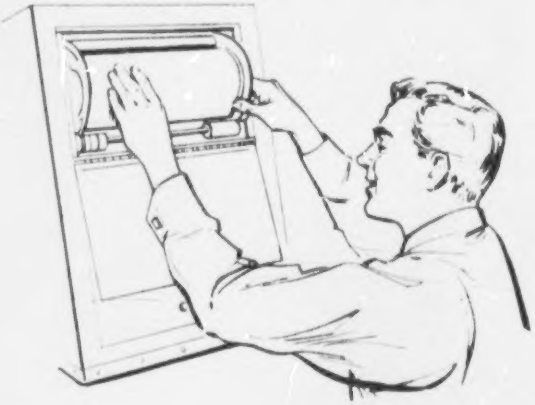
ASSIGNMENT: Mark True or False:

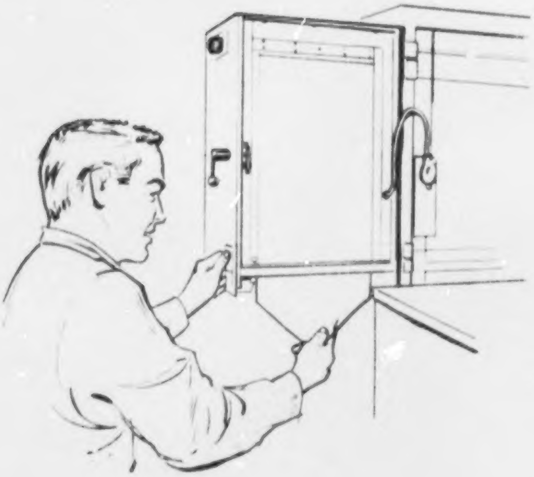
__________The Itek Platemaster makes plates for the press.

__________The plate material comes in 250′ rolls and is stored in the machine.

LESSON 4 – LOADING THE ITEK PROJECT-A-LITH

Open the top door of the magazine and put the roll in place. Feed the black paper leader through the slot above the roll. Close door.



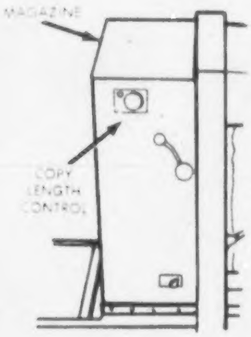


Unlatch and swing magazine open. Turn copy-length knob to raise curtain all the way. Pull black paper down to the two rollers at the bottom of magazine. Turn roller-pressure lever off. Feed black paper between rollers.

Close curtain about 3/4 of the way and pull black paper until plate material shows. Center the black paper on the marks. Turn roller pressure lever to ON.

Set PLATE-LENGTH CONTROL to 15′ and press exposure button. You will see how the plate material advances and is cut off. Close the magazine.

Raise curtain to fit copy length you are going to print.



Add about 1". If you are printing a sheet 11" long, set the length at 12".

This allows for material needed for clamp area on press. The curtain lets you expose just enough of the material for the plate you are printing.

The COPY-LENGTH SETTING and the PLATE-LENGTH SETTING must both be the same.

ASSIGNMENT:

Practice loading the machine until you understand it.

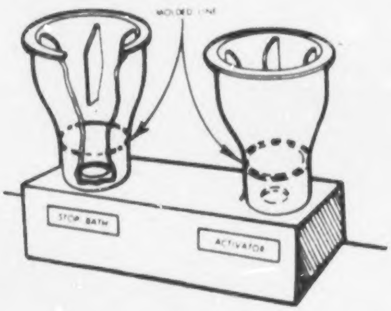
LESSON 5 – LOADING CHEMICALS

There are two chemicals used in the Itek machine. The ACTIVATOR is the name for the Itek developer. The STOPBATH is the name for the fixer. They do the usual jobs – developing and fixing.

It is very important that these chemicals do not get mixed up.

FILLING ACTIVATOR TANK

Using the activator bottle, measure 7 pints of activator concentrate and pour into activator filling spout.



Fill to line with warm water. Do not fill above the line.

Now pour 1 pint of activator concentrate into bottle. Fill the rest of the way up with warm water.

Put two fingers over the tubes and shake. Put the bottle into the holder with the cap down.

Any time you pour chemicals from one container to another, be careful! Remember – your eyes have to last a whole lifetime!

FILLING THE STOPBATH TANK

Measure 3 1/2 pints of stopbath concentrate in stopbath bottle and pour into filler spout.

Fill to line with warm water. Do not fill above the line.

Measure 1/2 pint stopbath concentrate into bottle. Fill rest of the way up with warm water. Put two fingers over tubes and shake. Put bottle in holder with the cap down.

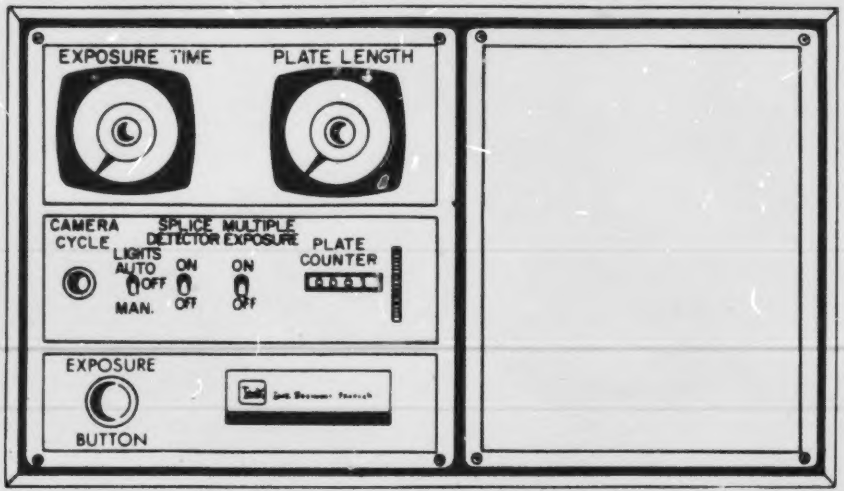
As the machine is used, these bottles have to be refilled. Always take them off the machine one at a time. Fill each one and return it. That way you will not get them mixed up and put back wrong.

ASSIGNMENT:

Pick correct words and draw a circle around them. It is (very important) (not important) to keep the ACTIVATOR and the STOPBATH separate and not mixed up.

LESSON 6 – OPERATING THE CONTROLS

The machine controls are all in one place – called the CONSOLE.


EXPOSURE TIME
PLATE LENGTH
CAMERA CYCLE
LIGHTS
AUTO
OFF
MAN.
SPLICE DETECTOR
ON
OFF
MULTIPLE EXPOSURE
ON
OFF
PLATE COUNTER
EXPOSURE BUTTON

The first dial is the exposure timer. It controls the time the shutter is open and the lights are on. It is marked off in seconds. Turn the knob to the number of seconds you want. The machine will now work the lights automatically.

The other dial is the PLATE-LENGTH CONTROL. It is marked off in inches. When we set the dial to 12, the machine will deliver a plate 12 inches long.

The light under the words CAMERA CYCLE goes on during the exposure and plate-advance. You can make another plate as soon as it goes off.

Next to that is a switch: LIGHTS AUTO and MAN. "AUTO" is short for "automatic," and MAN is short for "manual." Keep the switch UP in the AUTO position.

The SPLICE DETECTOR is a warning switch that tells us when the plate material has run out and it is time to put a new roll in. Keep this switch ON.

MULTIPLE EXPOSURE is usually kept in the OFF position. This is only used when we want to make more than one exposure on the same plate. You can make a step and repeat plate on this machine, but it is not very accurate.

The PLATE COUNTER keeps a record of how many plates have been exposed. It tells us when we are getting near the end of the roll. Always turn it back to zero when you put a new roll in the machine.

The EXPOSURE BUTTON is the main control. This starts the camera cycle and the development cycle.

There is a red light on the front of the machine. This is a warning light. When the developer is below 90° F, the light comes on. There is an electric heater that keeps the developer warm. The light goes off when the developer is warm enough. Then it is OK to make a plate.

ASSIGNMENT: Mark True or False:

__________The PLATE LENGTH CONTROL sets the exposure time.

__________The LIGHTS AUTO switch is usually kept up.

LESSON 7 – TIMING THE EXPOSURE

There are some things that you learn best through experience. Timing the exposure on the Platemaster is one of those things.

The standard exposure is 5 seconds for same-size reproduction. But sometimes the copy is poor – too light, too dark, or with smudges (dirty spots).

Increasing the exposure time will cut down the thickness of the black lines and get rid of weak lines (and smudges) completely. Therefore we increase the exposure for:

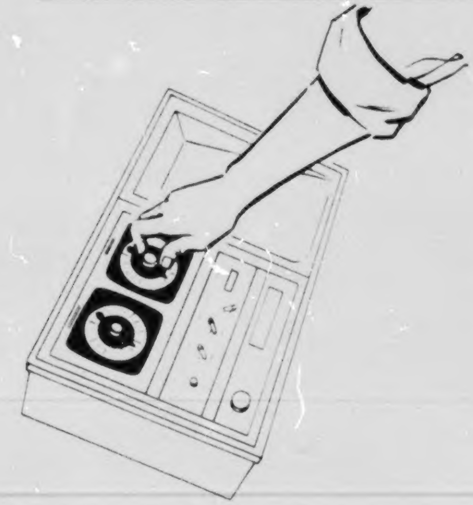
Reductions
"Dirty" copy
Too-dark copy
Too-"busy" copy

Reducing the exposure time makes the lines of the copy come out heavier and darker. Therefore we cut down the exposure time for weak or too-light copy.

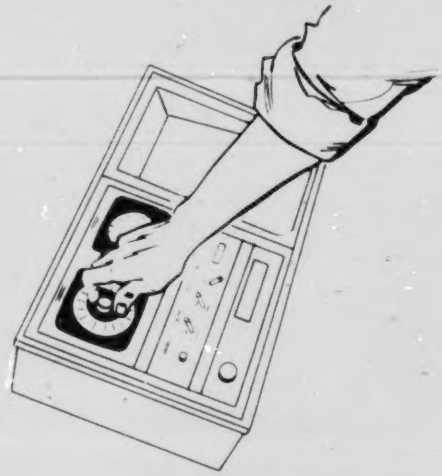
ASSIGNMENT:

Your instructor will show you examples of different types of copy. You will tell how long each should be exposed.

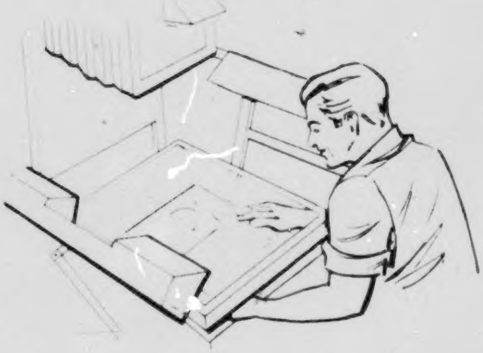
LESSON 8 – EXPOSING THE PLATE



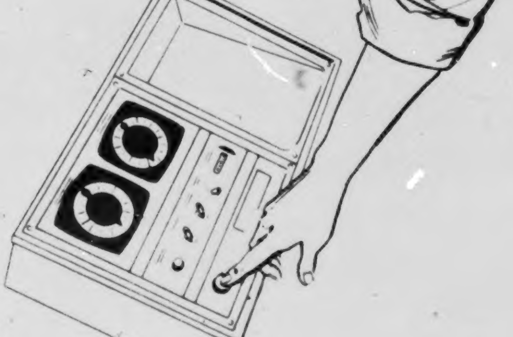
Set exposure timer



Set plate length and copy length control



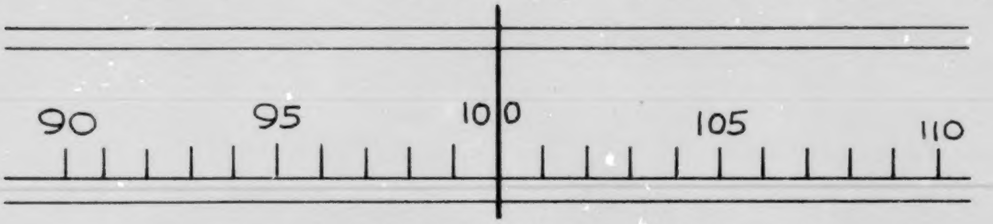
Position copy in copyboard



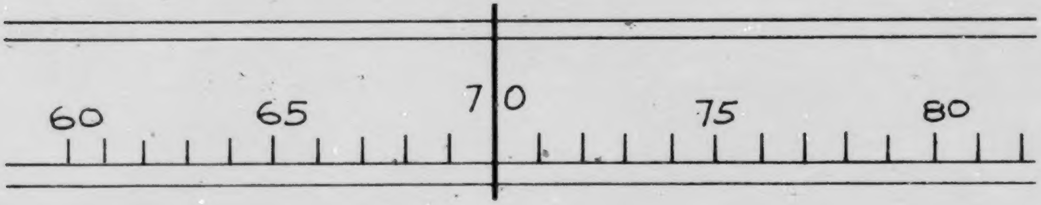
Press exposure button

LESSON 9 – CHANGING THE SCALE

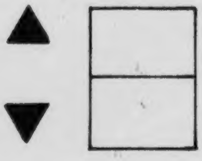
The Platemaster can reduce copy down to 50% or enlarge it up to 110%. The machine must be set for the percent marked on the copy. Stand in front of the machine and look up. You will see a numbered scale. This is the LENS SCALE. The numbers are percents.



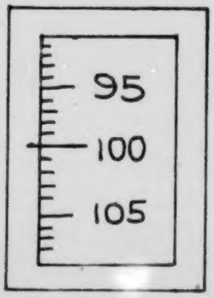
Turn the handwheel until the percent marked on the copy lines up with the center mark. The machine setting above is 100%, or full-size.



This setting is for a reduction to 70% of original size.



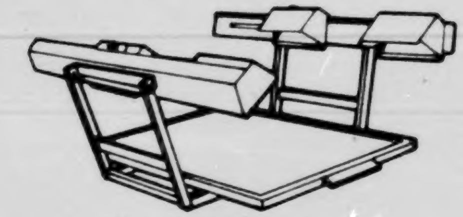
On the left of the machine, below the tapes, is the switch that moves the copyboard up or down.



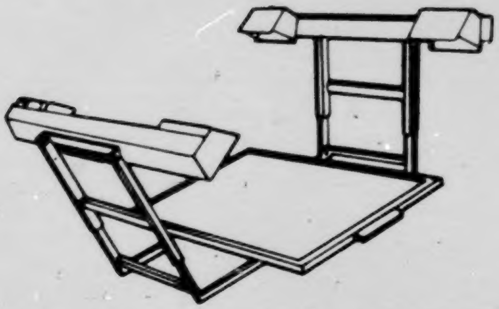
Farther down on the left side is a window with numbers on a tape. Move the copyboard until the number in the window is the same as the number on the lens scale.

For reductions to 70% or less, the lamp brackets must also be moved. They slide out from the side of the copyboard. They also move up. To move them up, release the pins, slide them up until they stop. The pins should fit into the new set of holes, and the lamps should stay up.

There are two more scales on the Itek. They are on the lamp holders. The lamps nearest the front of the machine do not move. The rear lamps must be moved along the scales to the same % as the other scales are set at.



This is the lamp position for 71% to 110%.



This is the position for 70% to 50%.

How many differences can you see between the two pictures shown above?

ASSIGNMENT: Mark True or False:

__________The number on the LENS SCALE must be the same as the number on the COPYBOARD SCALE.

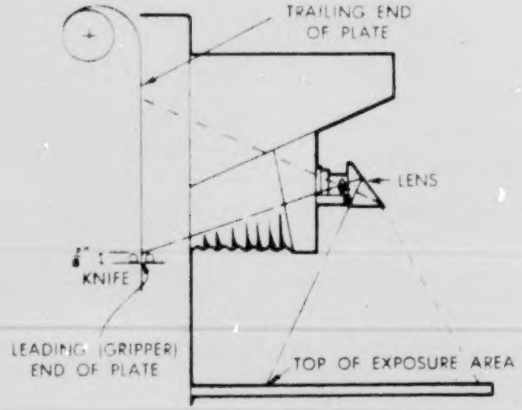
__________It is not necessary to move the lamps for a reduction of 50%.

Fill in with the number 1, 2, 3, or 4:

For a reduction to 60%, _____scales must read the same.

For an enlargement to 110%,______scales must read the same.

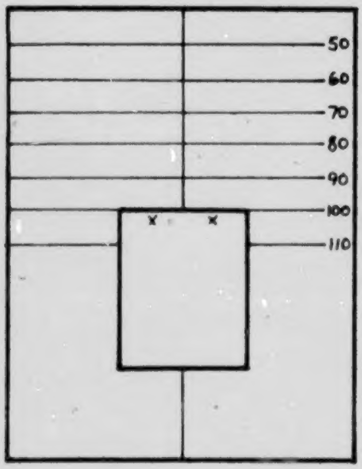
LESSON 10 – USING THE PLATEMAKER


TRAILING END OF PLATE
LENS
KNIFE
LEADING (GRIPPER) END OF PLATE
TOP OF EXPOSURE AREA

This is how the ITEK forms the image on the plate material from the original copy.

The copyboard has a centerline marked in yellow, so it will not print. There are also lines across the copyboard marked 110%, 100%, 90%, 80%, 70%, 60%, and 50%. Place the top of your copy at the percent you need. Find the center of your copy and position copy.

Be sure to keep the glass clean. Also the copyboard. The machine will copy anything that is dark – dirty fingerprints, ink smudges, anything. So – be a "good housekeeper".


50
60
70
80
90
100
110
x
x

ASSIGNMENT:

Expose the layouts you made earlier (pages 72 – 76). Make the first one 100%, the second one 60%, and your own original layout 110%.

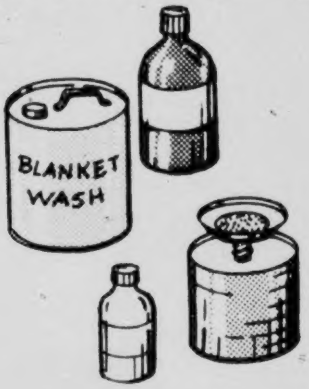
UNIT VII

OFFSET PRESS OPERATION

LESSON 1 – SAFETY

At the end of this unit you will print your earlier projects on the offset press.

Remember what we said way back at the beginning of this course? NO long sleeves, NO loose clothing, NO ties, necklaces, bracelets, or rings. SHORT hair, or hair tied back. Strong leather shoes. NO HORSEPLAY! Now we ask for something more, because we are going to work around the press. KEEP HANDS AWAY FROM ALL MOVING PARTS WHILE THE PRESS IS RUNNING! If you must make some change or adjustment – STOP THE PRESS.



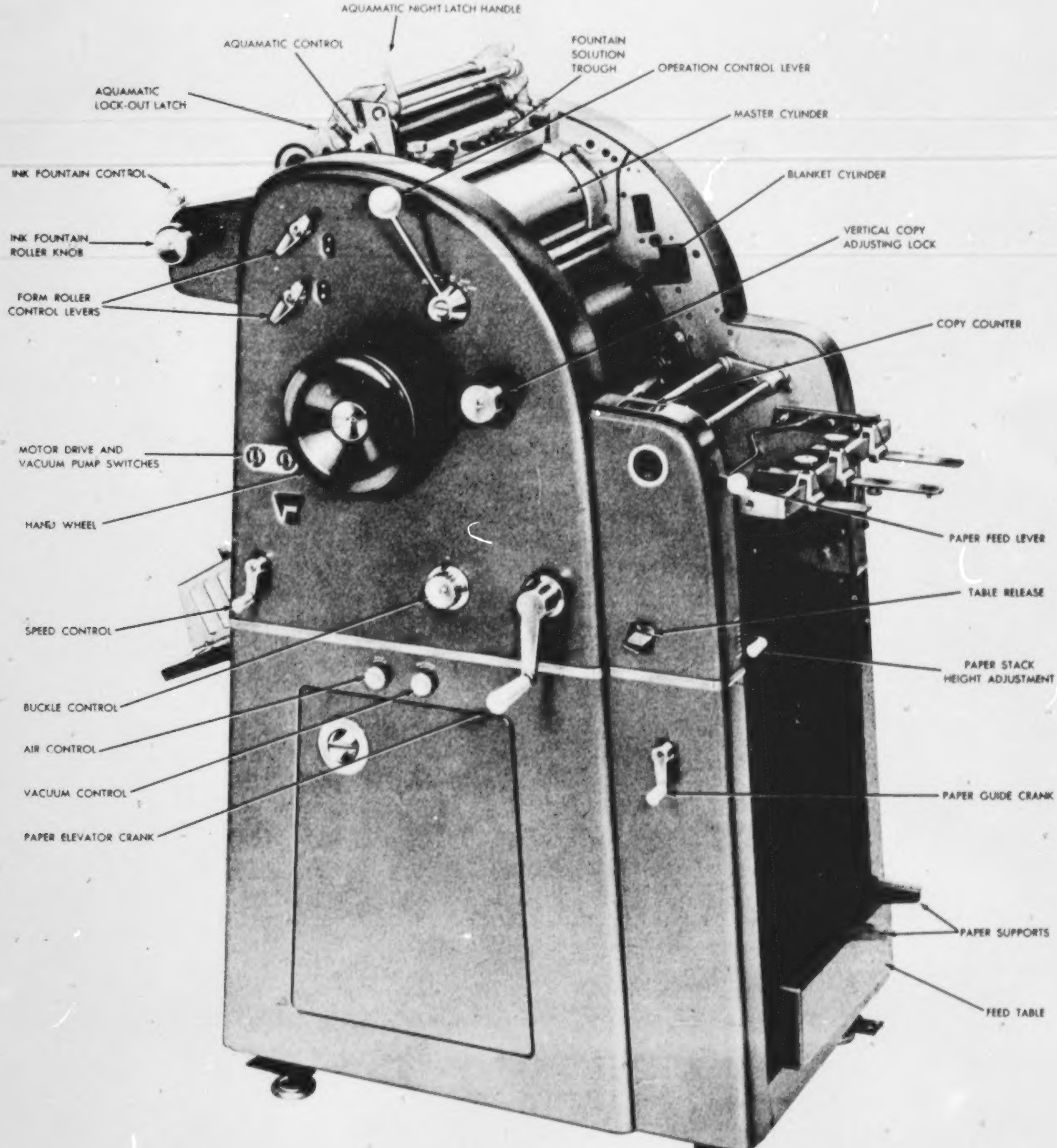
We use CHEMICALS to clean the press, and they can be dangerous if you are not careful. Don't splash them around so they can get in your eyes. If you are not sure what something is used for, ask your instructor.

A clean shop is a safe shop. Don't leave papers on the floor for someone to slip on and fall. Wipe up any water or chemicals that are spilled on the floor. Your shop is going to be your home for much of your life – both here at school and when you graduate and start working. Make it as pleasant a place to be in as you can. REMEMBER – in a print shop there are only two places we want to find ink. One is on the press and the other is on the paper. Learn to keep your hands clean.

LESSON 2 – A. B. DICK 360

Here is a picture of the press we have in our shop. It is a kind of press often used in the in-plant shops. It is the A.B. Dick 360.

OPERATING SIDE OF MACHINE


AQUAMATIC NIGHT LATCH HANDLE
AQUAMATIC CONTROL
FOUNTAIN SOLUTION TROUGH
OPERATION CONTROL LEVER
AQUAMATIC LOCK-OUT LATCH
MASTER CYLINDER
INK FOUNTAIN CONTROL
BLANKET CYLINDER
INK FOUNTAIN ROLLER KNOB
VERTICAL COPY ADJUSTING LOCK
FORM ROLLER CONTROL LEVERS
COPY COUNTER
MOTOR DRIVE AND VACUUM PUMP SWITCHES
HAND WHEEL
PAPER FEED LEVER
TABLE RELEASE
SPEED CONTROL
PAPER STACK HEIGHT ADJUSTMENT
BUCKLE CONTROL
AIR CONTROL
VACUUM CONTROL
PAPER GUIDE CRANK
PAPER ELEVATOR CRANK
PAPER SUPPORTS
FEED TABLE

Words to learn:

A.B. Dick – Name of the company that makes the press.

AQUAMATIC – Automatic mixing of water and ink.

BLANKET – Piece of smooth rubber that carries the IMAGE from the plate to the paper.

CYLINDER – Large roller. There are three cylinders on the press – the PLATE CYLINDER, the BLANKET CYLINDER, and the IMPRESSION CYLINDER.

DUCTOR – Name of the roller next to the AQUAMATIC ROLLER. Carries FOUNTAIN SOLUTION to the other rollers.

FORM ROLLERS – The rollers that carry the ink to the master cylinder.

ETCH – Chemical used on the OFFSET PAPER MASTERS.

FOUNTAIN SOLUTION – Chemical and water mixture. In bottle over the FOUNTAIN. Keeps plate wet.

OSCILLATING – Name of the roller that moves back and forth as the press is running.

SUCTION – A sucking up. Supplied by the VACUUM PUMP. Allows press to pick up one sheet at a time.

ASSIGNMENT:

What is the name of the press?____________________________

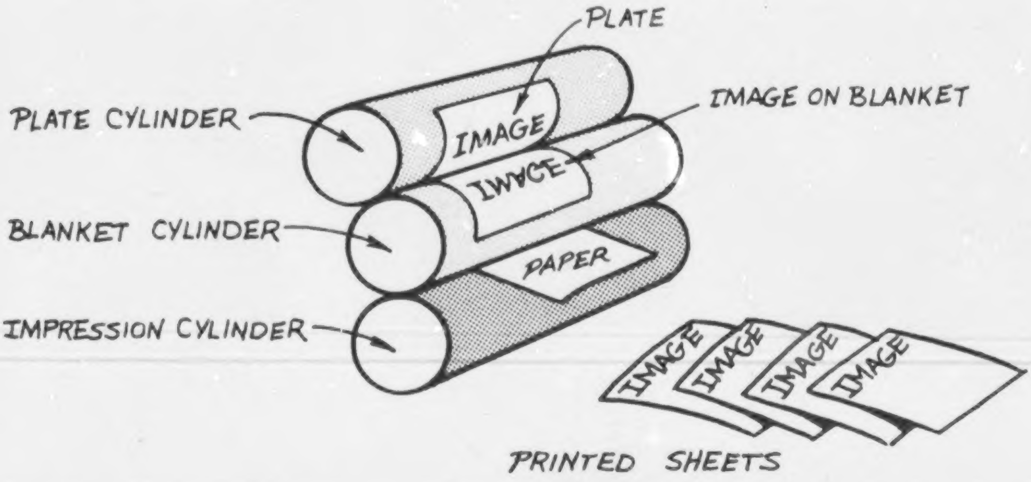


PLATE
PLATE CYLINDER
IMAGE
IMAGE ON BLANKET
IMAGE
BLANKET CYLINDER
PAPER
IMPRESSION CYLINDER
IMAGE
IMAGE
IMAGE
IMAGE
PRINTED SHEETS

The reason that offset works is that grease and water do not mix.

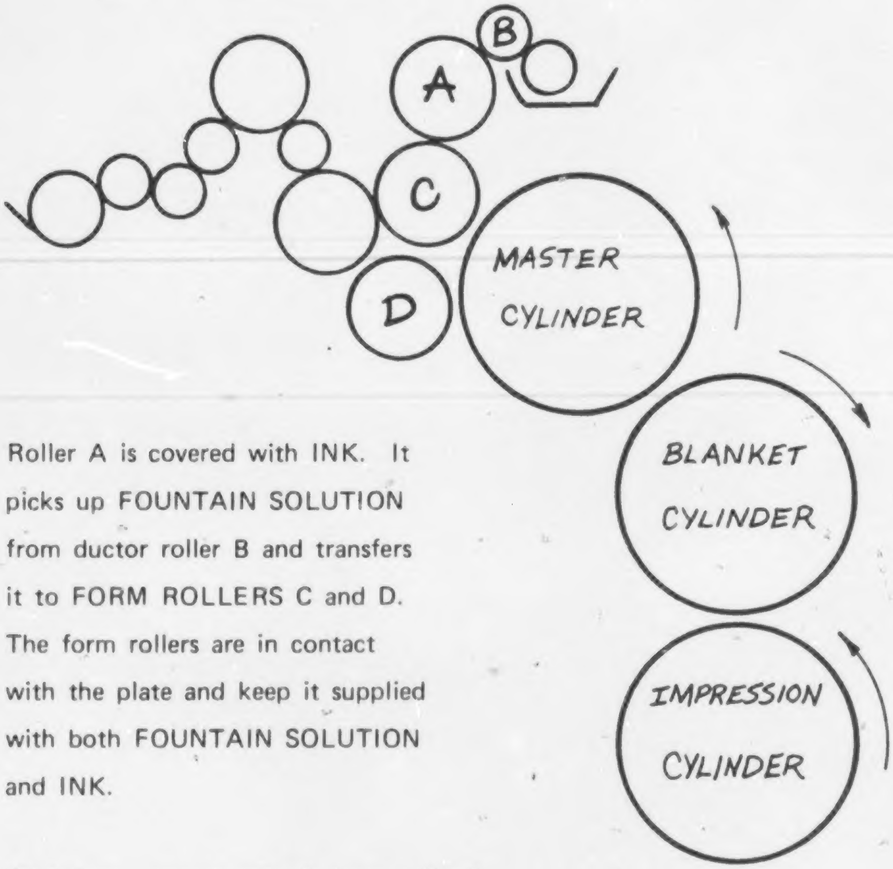
The IMAGE on the plate does not accept water. Only ink. The clear area around the image will not accept ink. Only water.

We put ink in the ink fountain at the back of the press, and fountain solution in the fountain at the front. The AQUAMATIC ROLLERS keep the plate WET. The FORM ROLLERS carry the ink from the ink fountain to the plate. The ink sticks to the IMAGE area because it is dry. The IMAGE is greasy, and water will not stick to it. There are 12 rollers that carry ink to the plate.

The ink that sticks to the IMAGE on the plate comes in contact with the BLANKET, and the blanket takes some of the ink off the plate. If you look at the IMAGE it is now a mirror image – it's reversed. Now – here comes the paper. The IMPRESSION CYLINDER presses the paper against the BLANKET, and the IMAGE is OFFSET on to the paper.

And that is how OFFSET works. It makes no difference how large the press is – the same things happen.

Here is how the rollers work on the A.B.Dick 360



Roller A is covered with INK. It picks up FOUNTAIN SOLUTION from ductor roller B and transfers it to FORM ROLLERS C and D. The form rollers are in contact with the plate and keep it supplied with both FOUNTAIN SOLUTION and INK.

Why does a press need all those rollers?
They work together to smooth out the ink, so that each sheet of paper gets the proper amount of ink coverage.

Larger offset presses have more rollers. Table-top presses have fewer rollers.

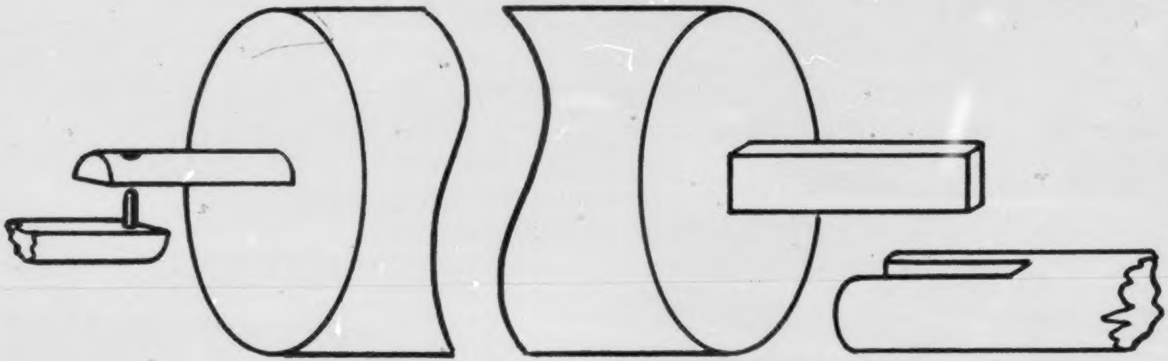
All offset presses work on the same idea. They all need a combination of INK and FOUNTAIN SOLUTION.

ASSIGNMENT: Write True or False in front of these sentences:

__________The offset press must have both ink and water to print.

__________The paper comes in contact with the plate.

Before you reach for the ink, reach for the AQUAMATIC OSCILLATING ROLLER. Put it in printing position. Like this

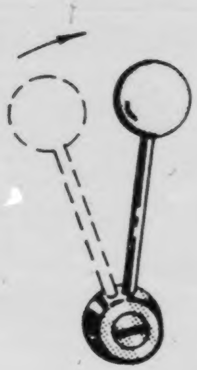


Make sure the FLAT side of the shaft is DOWN.

The other end has a STRAIGHT-SIDED shaft. It fits into the slot.

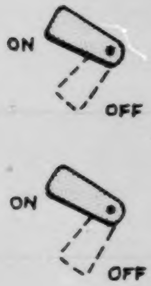
Drop the INK OSCILLATING ROLLER into position. It just sits on the two smaller rollers below. These two rollers are moved up and away from the other rollers whenever you are not using the press, as at night. The reason is to keep them from getting flat places where they touch the two smaller rollers below.

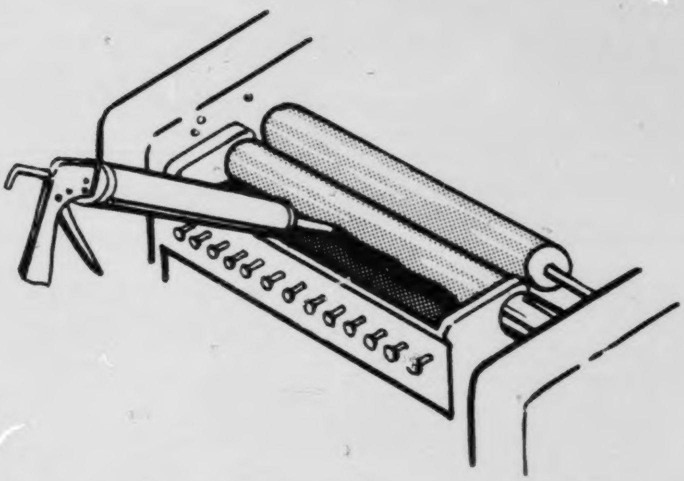
Move the AQUAMATIC NIGHT LATCH HANDLE to the back of the machine. This is the operating position. If you forget to do this, you are going to be busy cleaning ink off the plate, or the plate cylinder if there is no plate on the press. Remember – if the plate or the plate cylinder gets dry, the ink will completely cover it, because they will be **DRY**. Must have that fountain solution!



Move OPERATIONAL CONTROL LEVER from NIGHT LATCH to NEUTRAL

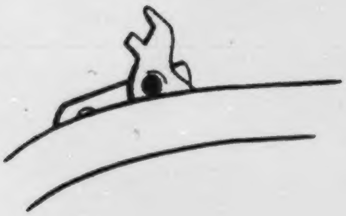
Move the INK FORM ROLLERS up to the ON position

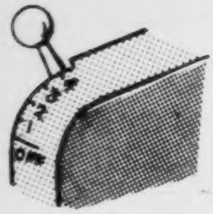




Squeeze ink from cartridge into the INK FOUNTAIN

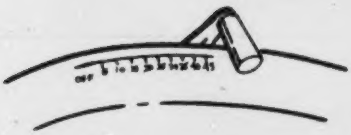
Raise AQUAMATIC LOCK-OUT LATCH

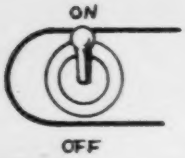




Move INK CONTROL LEVER to number

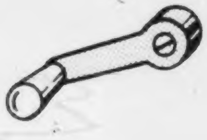
Move AQUAMATIC CONTROL as far as it will go

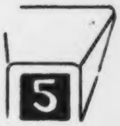




Turn MOTOR DRIVE SWITCH to ON position

Slow machine to slowest speed by turning crank





Let press run until all rollers are evenly covered with a thin film of ink, including the two in the AQUAMATIC UNIT.

This will take about 2 or 3 minutes.

Turn INK FOUNTAIN CONTROL OFF.

Raise AQUAMATIC CONTROL to about 15.

Lower AQUAMATIC LOCK-OUT LATCH.

Turn MOTOR DRIVE SWITCH to OFF.

ASSIGNMENT: Mark True or False:

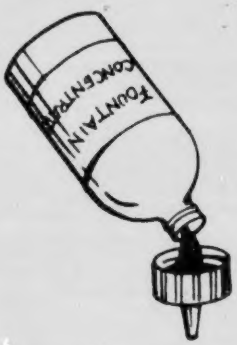
____________The press is inked before the FOUNTAIN SOLUTION is added.

____________The press is run at the slowest speed while inking.

____________It takes about 15 minutes to get the press inked up.

LESSON 5 – ADDING THE FOUNTAIN SOLUTION

All rollers MUST be covered with ink – AQUAMATIC ROLLERS too – before FOUNTAIN SOLUTION is added. If not, run press until they are.



Pour ONE capful of FOUNTAIN CONCENTRATE into cap of plastic bottle. Pour this amount into the bottle and fill the rest of the bottle with water. Screw on cap. This gives you the right amount – 1 part CONCENTRATE to 15 parts of water. Some shops find that a different amount works better. Follow the instructions of the person in charge.

Make sure that the drain hose is in place. Turn bottle upside down and put cap into fitting in tray. The SOLUTION will fill tray up to the mark on the side. As solution is used up in printing, more will run out of the bottle, so the tray is always full.

Press is now ready to run.

ASSIGNMENT: Pick correct number:

Pour (6) (15) (1) caps of FOUNTAIN CONCENTRATE in plastic bottle.

LESSON 6 – HOW THE FEED SYSTEM WORKS

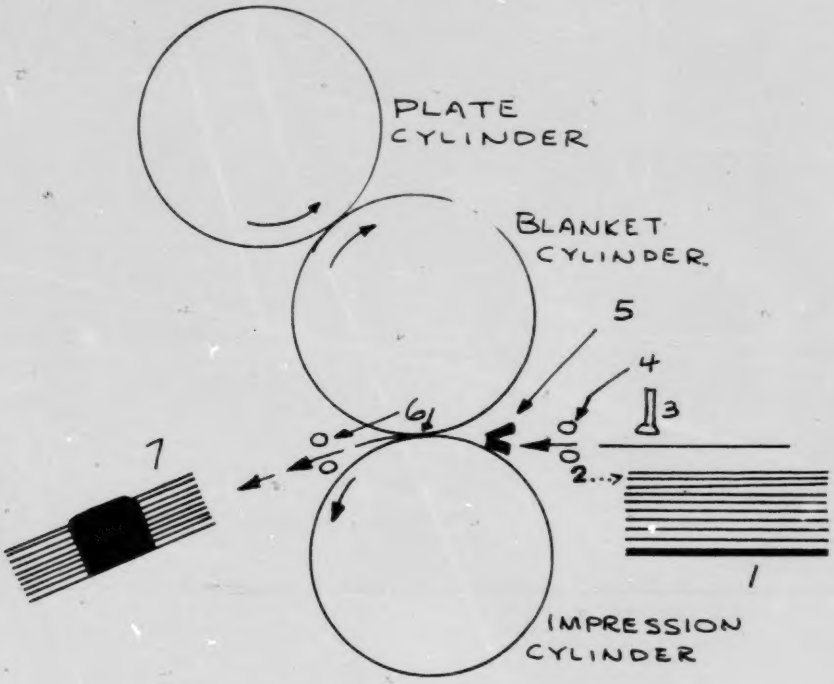


PLATE CYLINDER
BLANKET CYLINDER
5
4
3
6
7
2
1
IMPRESSION CYLINDER

1 – Paper stacked – ready to print.

2 – Air blows against stack. Lifts and separates top sheets.

3 – Suction feet lift top sheet and move toward press.

4 – Rubber rollers feed sheet into gripper fingers.

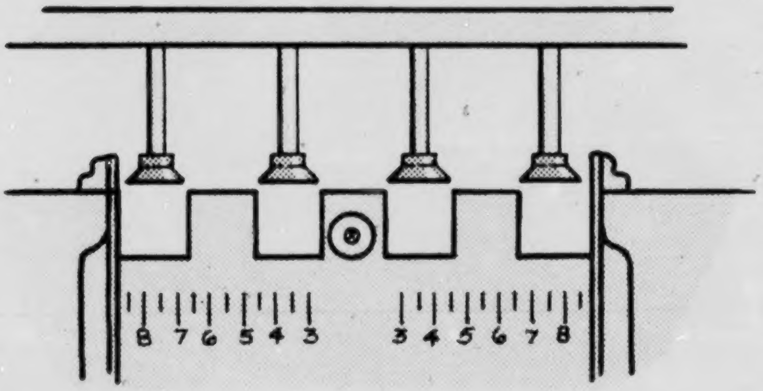
5 – Gripper fingers pull sheet through press. Sheet is now getting the IMAGE from the blanket.

6 – Gripper fingers release sheet. Ejector fingers and wheels guide sheet to receiving tray.

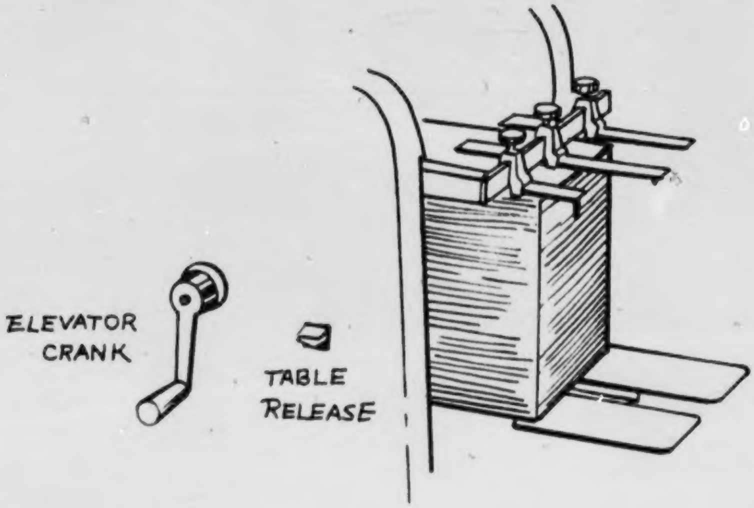
7 – Automatic jogger neatly stacks sheets.

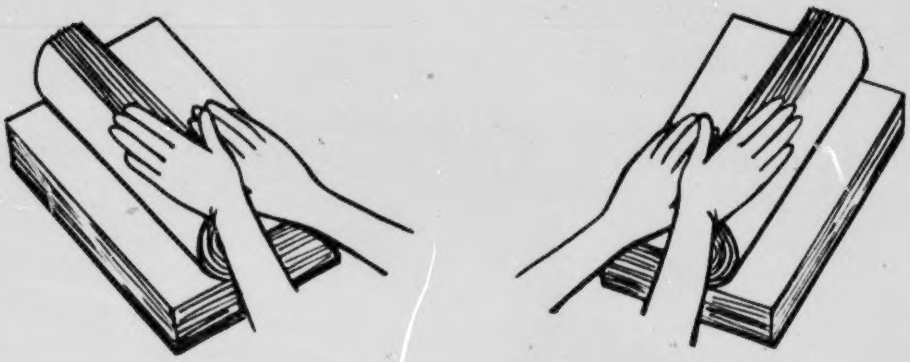
LESSON 7 – LOADING THE PAPER

There is a small crank on each side of the FEEDER. These cranks set the PAPER GUIDES. Look at the back of the press where the paper goes. You will see a scale with numbers on each side. Turn the cranks until the INSIDES of the guides line up with 8½. Press is now ready to take a sheet 8½" wide, centered on the press.



Press table-release bars together, push in and turn PAPER ELEVATOR CRANK to lower PAPER FEED TABLE.

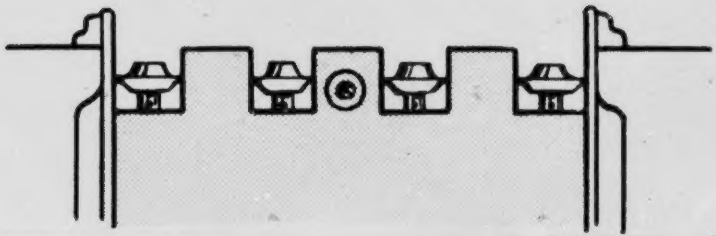




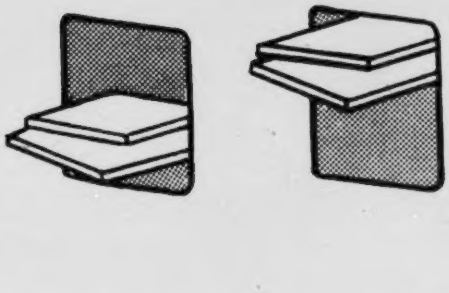
FAN paper before you put it in the FEEDER. Both sides.

This prevents running two sheets through the press at one time.

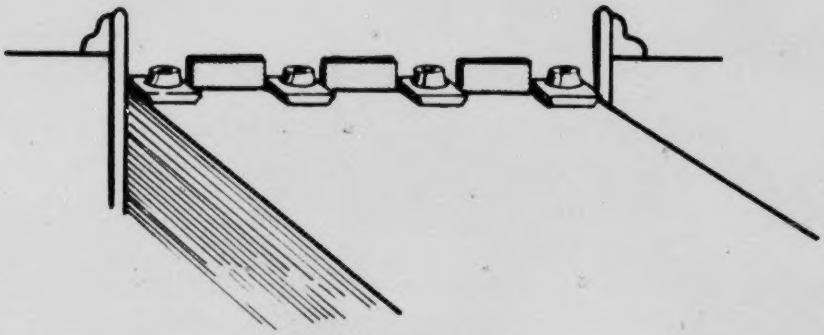
Turn HANDWHEEL on side of press until PAPER-HEIGHT REGULATORS are in the lowest position.



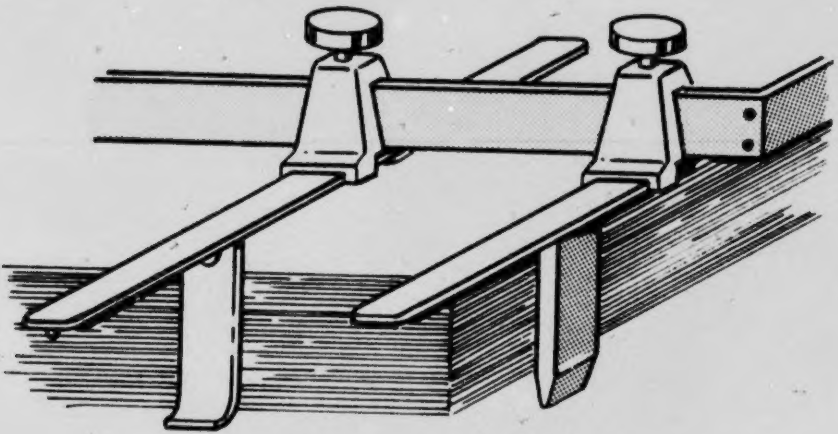
Unlock TABLE RELEASE



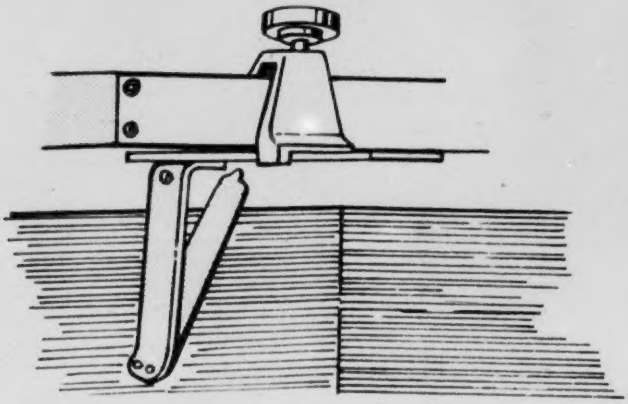
Turn PAPER ELEVATOR CRANK until paper touches PAPER-HEIGHT REGULATORS



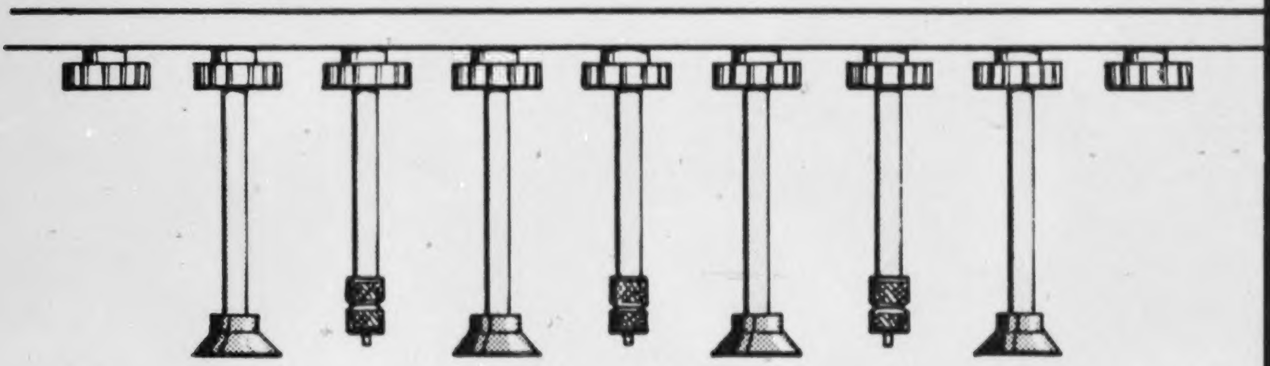
On the left side of the paper is a flat spring.



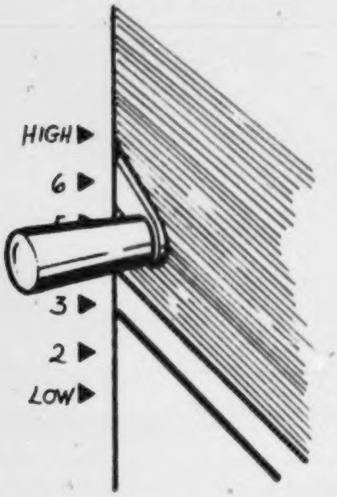
Push this guide up to the side of the paper until it just touches. Lock in place, about in the middle of the sheet.



The two PLUGS, 3 LEVELERS, and 4 SUCTION FEET are threaded into the bar. They can be moved around to fit different sizes of paper in the feeder. The plugs are used to stop up any open space.



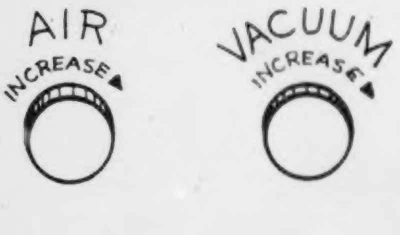
PAPER STACK HEIGHT



For most papers we will be printing, the setting will be from 4 to 6.

Low numbers are for LIGHT-WEIGHT paper and high numbers for HEAVY-WEIGHT

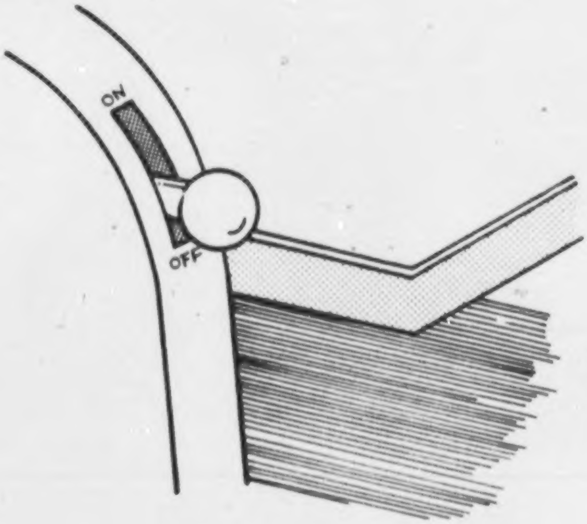
AIR – VACUUM SETTINGS



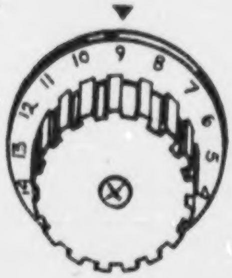
Turn both knobs all the way to the right. Move PAPER-FEED LEVER off (down). Now – turn both knobs back (to the left) 3 half turns.

Turn motor-drive and vacuum-pump switches on. If paper fluffs up and follows HEIGHT REGULATORS – fine. If not – increase air by turning air knob to the right.

Turn motor drive off. Lift PAPER FEED HANDLE. Turn HANDWHEEL to the left until paper is picked up and fed into the press.

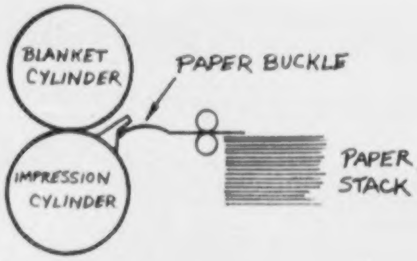


BUCKLE CONTROL


4
5
6
7
8
9
10
11
12
13
14

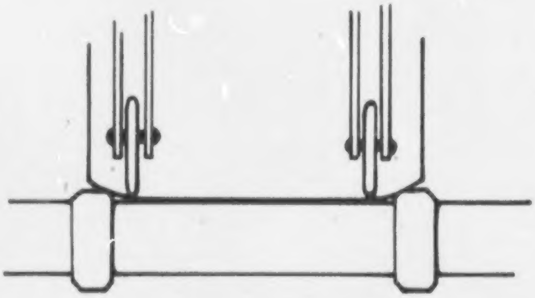
BUCKLE-CONTROL KNOB is on side of press, right above AIR and VACUUM knobs.

Setting for 20# stock is 5 or 6. This helps make sure every sheet prints in the same position.


BLANKET CYLINDER
PAPER BUCKLE
IMPRESSION CYLINDER
PAPER STACK

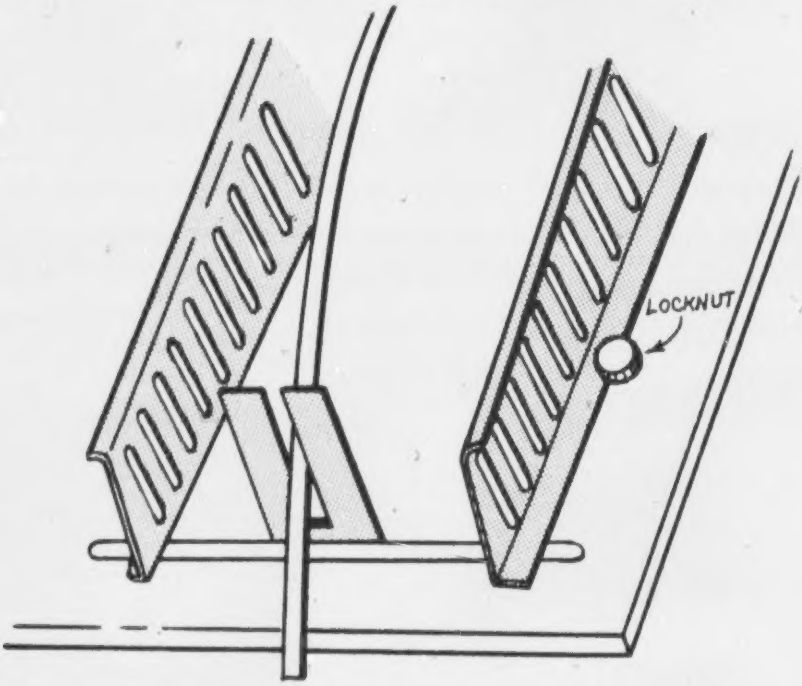
RECEIVING TRAY

The sheet you have just fed through the press comes out the back. You see two wheels, and on the shaft there are two rings. If you move them so they look like the drawing, the paper will have a slight curl at the sides. This makes it leave the press and settle in the tray without trouble. Be sure that the wheels do not ride on the inked copy.



Sometimes the paper will have a curl in it already. You may have to slide the wheels outside the rings, just opposite to the way the drawing shows.

Move left-hand FENCE over to meet the paper. Turn HAND WHEEL until right-hand, or JOGGING, side moves in as far as possible.



Loosen the large round locknut on the fence and move FENCE over until it touches the sheet. As each sheet drops out of the press, the FENCE pushes it over against the left and the stack of paper will be neatly jogged.

ASSIGNMENT: Mark True or False

__________The buckle control makes the printing on each sheet come in the same place.

__________Setting for 20# stock is about 5 or 6. Feed sheet through press and set left- and right-hand FENCES.

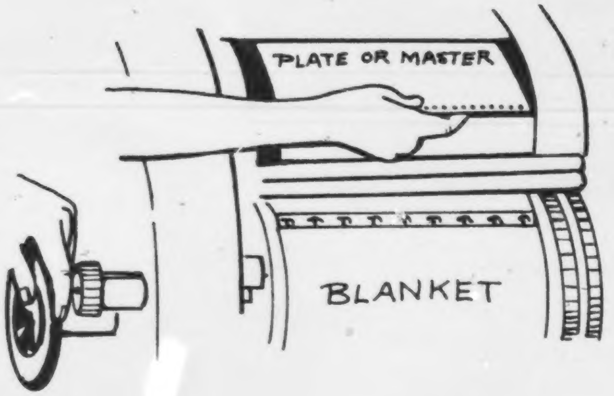
LESSON 8 – ATTACHING MASTER OR PLATE TO PRESS

Soon we are going to print an OFFSET MASTER that you learned to make earlier in this book.

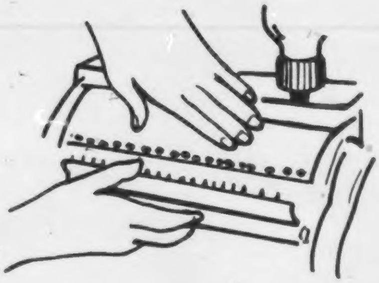
If we put the master on and started to print with the master dry, the whole master would fill with ink.

Lay the MASTER on the table. Wet a cotton pad with BLUE ETCH; squeeze out until it does not drip. Now wipe the pad over the whole surface of the master. Do this two times to be sure you have not missed any place.

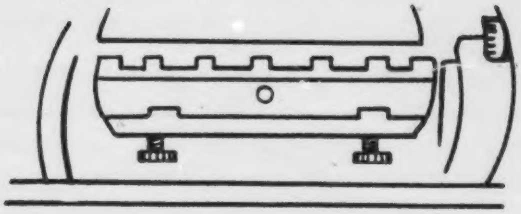
PINBAR



Place holes in gripper end of master or plate over the row of pins on the HEAD CLAMP. Hold other end out with right hand. Turn handwheel with left hand until the tail clamp comes around.



Hold master tightly against cylinder with left hand. Lift TAIL CLAMP and then drop it down so pins go into holes at the end of the master. After the tail clamp is in place, tighten the two locknuts. Be careful if you are using an offset paper master. If you tighten too much, the pins will tear the holes.



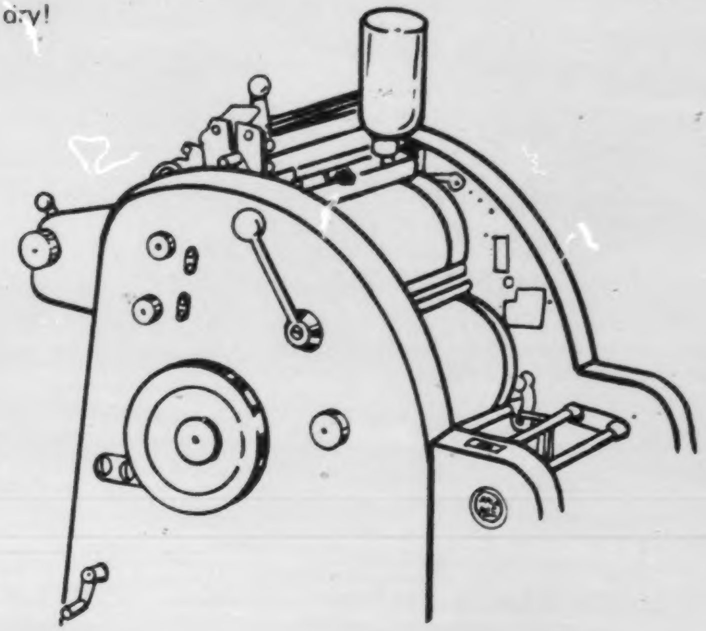
STRAIGHT EDGE

Some plates and masters, and all Itek plates have no holes in either end. There is a metal tab in the middle of the head clamp. Push it back and put the plate in the slot. Push the plate all the way back against the fingers. Let go of the tab, and the spring will hold the plate.

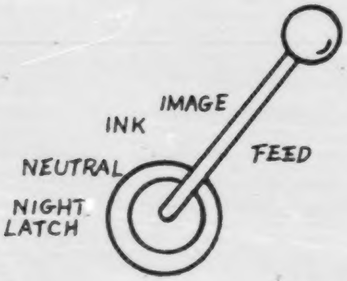
LESSON 9 – PRINTING COPY

This is the lesson where you get to print something!

If you take more than 2 minutes to put the plate on the press, it will be dry!



Start the press immediately, turn the FORM ROLLERS to the On position and the AQUAMATIC CONTROL to 20. Move OPERATION CONTROL lever to INK.



Run press for about five revolutions. Move IMAGE CONTROL LEVER to the right as far as it will go and hold for three or four revolutions. The IMAGE will appear on the blanket.

Raise PAPER FEED LEVER and run a sheet through press. Lower lever to stop feed. Check to see if image is in correct position on the paper. If changes are needed, turn form rollers OFF. The master will dry out when you stop to make changes in position. Before restarting press, you must wet it again.

Wet a cotton pad in the FOUNTAIN SOLUTION and squeeze — so it does not drip — and go over the whole master. Proceed to print another sheet and check position. If OK, then continue printing the required number of copies.

Ink should only be on the IMAGE area of the plate. If there is ink anywhere else, move AQUAMATIC CONTROL down as far as it will go. Leave lever on INK for a couple of minutes. This will clear the plate.

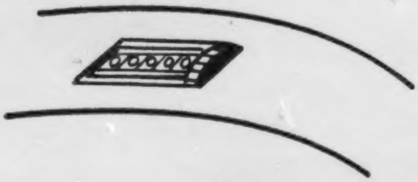
ASSIGNMENT:

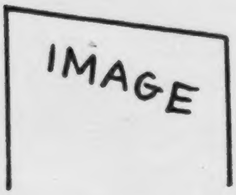
That is a lot to remember, isn't it? Let's see if you can put these different steps in order. Pick out the first step and write 1 in front of it. Write 2 in front of the step you think comes next, and so on.

______Move operation control to INK.
______Set aquamatic control to 20.
______Turn form rollers to ON.
______Raise paper-feed lever.
______Turn motor drive and vacuum switches to ON.
______Lower paper-feed lever.
______Move operation-control lever to FEED.
______Check the printing.

Now – look at the sheet. Check it with the copy. Is the IMAGE printed in the same position? Is the copy straight on the sheet?

If the sheet is OK, move the counter back to 0 by turning the small black wheel. Lift PAPER-FEED lever and print the number of sheets needed.



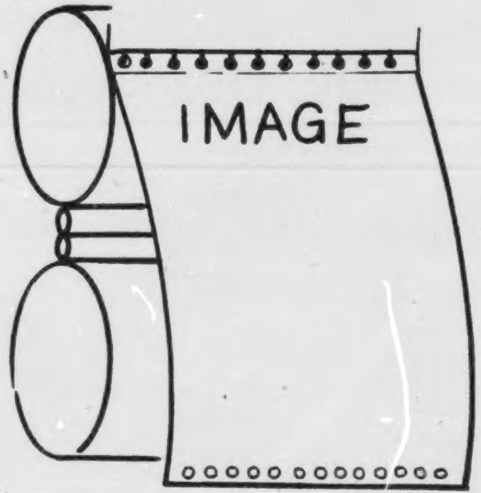


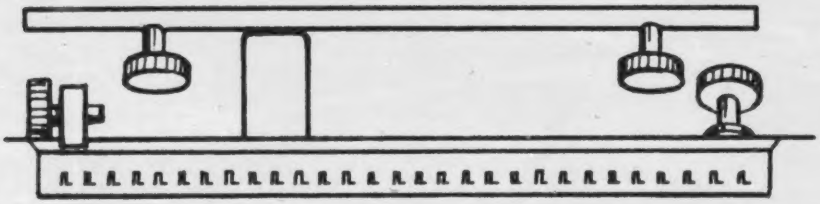
If copy is not straight on the paper, stop the press. Move the OPERATING CONTROL lever to NEUTRAL.

Turn HANDWHEEL to the left until the tail of the plate comes around. Take it off cylinder.

Turn HANDWHEEL back to the right, until the HEAD CLAMP comes around.

Let plate hang down from clamp.



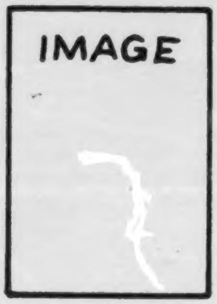


If copy is running "down hill," turn the adjusting knob to the right to raise the right side. If the image is running "up hill," turn the knob to the left.

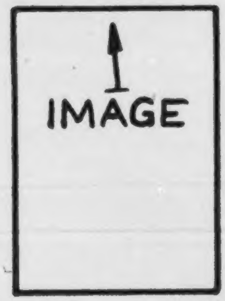
Are the FORM ROLLERS off? If not, turn them off.

Place the plate back on the plate cylinder.

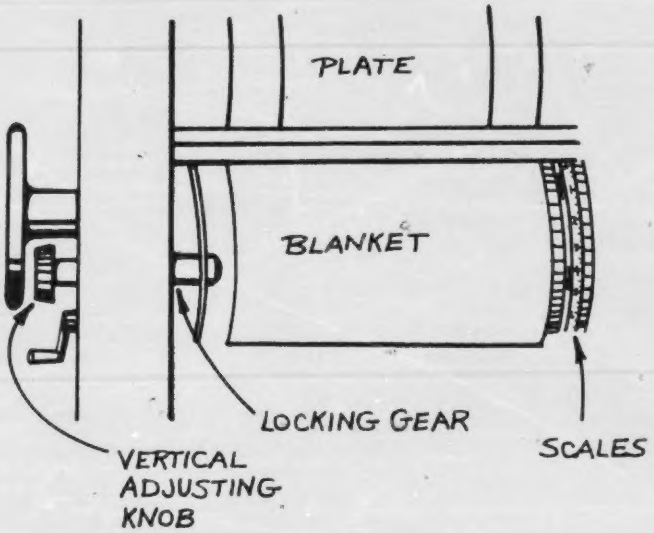
Wet rag with BLANKET WASH and clean IMAGE off the blanket. Start the press. Turn FORM ROLLERS on. Ink the plate and print a sheet. Write number 2 on the top of the sheet. Now you will know how you are doing on the adjustments.



If copy is now straight on the sheet, continue printing. If not, make another adjustment.



Copy too low on sheet? Stop the press.



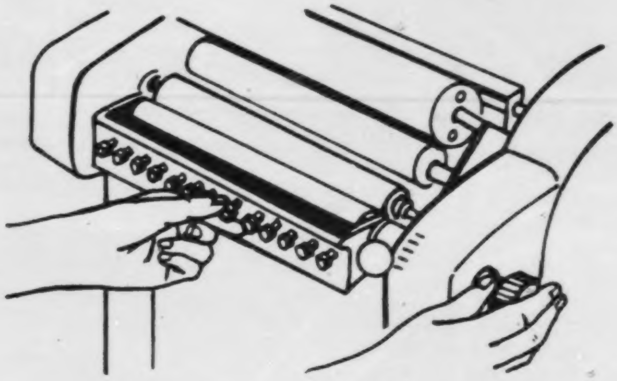
On the right side of the cylinder you will see two white scales. They are marked off in inches. Each mark is 1/8". They tell you how far to move the cylinder. Let's say the copy is ½" too low. You will want to move the cylinder 4 marks ($\frac{4}{8} = \frac{1}{2}$).

Turn HANDWHEEL until shaft of VERTICAL ADJUSTING KNOB lines up with locking gear. Push knob IN with right hand. Turn it to the left to unlock the cylinder. Now keep your right hand on the knob and turn the HANDWHEEL with your left hand. This will move the cylinder. If you want to move IMAGE up – turn wheel UP. If copy is too high, turn wheel DOWN. Watch the scales. One will move with the cylinder, the other is fixed. Move the cylinder the correct distance.

Now turn the VERTICAL ADJUSTING knob to the right to lock the cylinder. Start press. Check copy.

You do not have to clean the blanket when you make this adjustment. You do have to wet the plate with fountain solution. If you don't, the plate will load up with ink. Can you think why? Right! The plate must be kept wet.

Start press again. Print sheet. Check with original copy. If position is OK, go ahead and finish printing. If not, try again. Keep watching the sheets as they fall into the delivery tray. Be sure they have enough ink. If sheets print too light, add more ink.



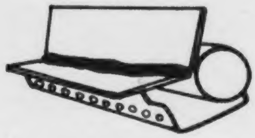
Make changes slowly. Just a little bit at a time. If you get too much ink in the press system, you will have a lot of trouble. Add ink by moving the INK FOUNTAIN CONTROL one number higher. The control has 4 positions. Press runs best with the smallest amounts of ink and water that will print well.

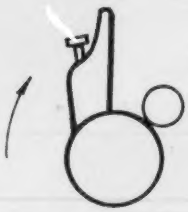
If sheets print too light, the trouble could also be in the setting of the AQUAMATIC CONTROL. Move this a little bit at a time. It should be set at about 20. Remember – all the way down is fountain solution. As you move the control up, you are increasing the ink. You will know when you have gone too far. The sheet will begin to tone. This means that the plate is running dry, and ink is piling up in the non-image areas. Clean the blanket and move the control down a bit.

LESSON 10 – CLEANING THE PRESS

Many people get hurt cleaning the press. I don't know why this is, but I think it is because we are in a hurry. Remember, no machine can say "I'm sorry, here is your finger back"! If you must put your hand in there – stop the press!

Cut two pieces of heavy stock as wide as the fountain and about 4" across. Slide one piece under the ink in the fountain and the other on top. Lift the ink out of the fountain and throw away.

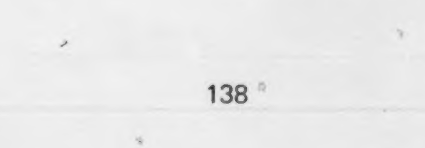




Raise the fountain and lift off. Remove the screws that hold the blade and clean thoroughly. Remove the INK DUCTOR ROLLER and clean by hand.

Put some blanket wash on a rag and clean the fountain roller.

Feed a piece of scrap paper into the roller system by turning the handwheel. Feed in to within about an inch of the end and then feed out again. Throw away carefully – we don't want ink all over everything. Repeat with other rollers and take all the excess ink off. This saves time later.



Drain the FOUNTAIN SOLUTION from the tray by using the hose. When no more solution drains out, unscrew the two knobs holding the tray and remove the tray. Clean and dry the tray. Make sure there is no ink on the inside of the tray.

Get a CLEAN-UP MAT and put it on the press the same as you would a plate or master.

Set controls as you would for INKING:

FORM ROLLERS – on
AQUAMATIC CONTROL – full on
OPERATION-CONTROL lever – ink position

Pour a little BLANKET WASH on INK OSCILLATING ROLLER. Use just enough to keep the rollers wet. Too much blanket wash will thin the ink, and it will run all over the press.

The clean-up mat will soon be full of ink. Take it off and save. After it dries it can be turned over and used for the next clean-up.

Put a new mat on press. Repeat the operation . . . It usually takes about 4 mats to do the job.

Go over all the rollers with a clean, dry rag and make sure all the ink is off and the rollers are dry. Make sure there is no image in the blanket. Clean all the metal rollers.

Put AQUAMATIC FOUNTAIN back on press and screw down.

Put AQUAMATIC CONTROL in NIGHT LATCH position.

Turn FORM ROLLERS to off position.

Raise AQUAMATIC OSCILLATING ROLLER and INK OSCILLATING ROLLER so the rollers are not in contact.

About once a week, after the wash-up with BLANKET WASH is finished, we use INK-ROLLER CONDITIONER to keep the rollers in good shape.

Put a WASH-UP MAT on machine; set the controls just as you did for the clean-up. Pour just a little INK-ROLLER CONDITIONER on the rollers and run press for 4 or 5 minutes. This lets the conditioner get into the rollers and remove any old ink that was still on them. You will be surprised to see how much ink there still is on the press after the clean-up. Use 2 mats in this operation.

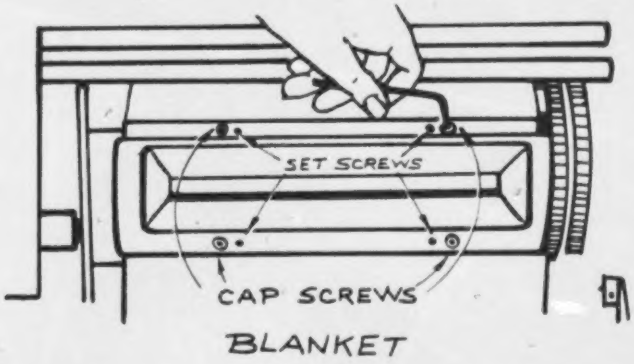
Now – you must use the BLANKET WASH again to remove all of the INK ROLLER CONDITIONER. You can't see it on the rollers, but it is there and should not be left on the rollers. About 2 mats should be enough cleaning.

Prepare the press for standing over the weekend the same as you did for the regular wash-up.

Replace the INK FOUNTAIN and the INK DUCTOR ROLLER that you took off when you first started the clean-up.

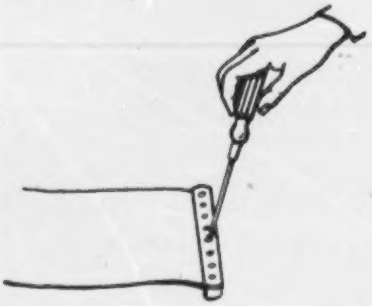
Clean the outside of the machine. Wipe up any spills of blanket wash, or any ink. Remember, the only place for ink is on the printed sheet. A clean press will help keep you and the job clean.

LESSON 11 – CHANGING THE BLANKET



Use an ALLEN WRENCH and loosen the four set-screws.

Remove the four cap-screws and take blanket and bars off the press.



Turn blanket over on the table and take out the screws that hold the blanket to the bars. Throw away the old blanket and replace with a new blanket. Make sure the screws are tight. It's a good idea to keep something under the new blanket so it will not get dirty. A piece of newspaper will do.

Now you are ready to put the blanket back on the press. Replace the four cap -screws and the four set-screws. Tighten evenly. After you have run about 200 sheets through the press, stop and tighten the screws again. The blanket will stretch a little.

Now you are ready to print again. Be careful of the blanket. Don't scratch or dent it, or you will never get a good impression on the sheet you are printing.

The blanket must be kept clean, or you will get poor-quality printing.

The surface should look dull, not shiny like a piece of metal. Even though you are careful and clean the blanket with blanket wash often, you can't get all of the old ink off.

The shininess on the blanket is called a GLAZE. This is a build-up of old ink and blanket wash. To clean that off, we use another chemical called GLAZE REMOVER. It's usually used on the blanket, but it can be used on the rollers too.

Wet a clean rag with some GLAZE REMOVER and go over the whole blanket. Rub hard. Again, you will be surprised at all the old ink that comes off on the rag.

After you have the blanket clean, use some BLANKET WASH to remove the GLAZE REMOVER, just as you removed the INK ROLLER CONDITIONER.

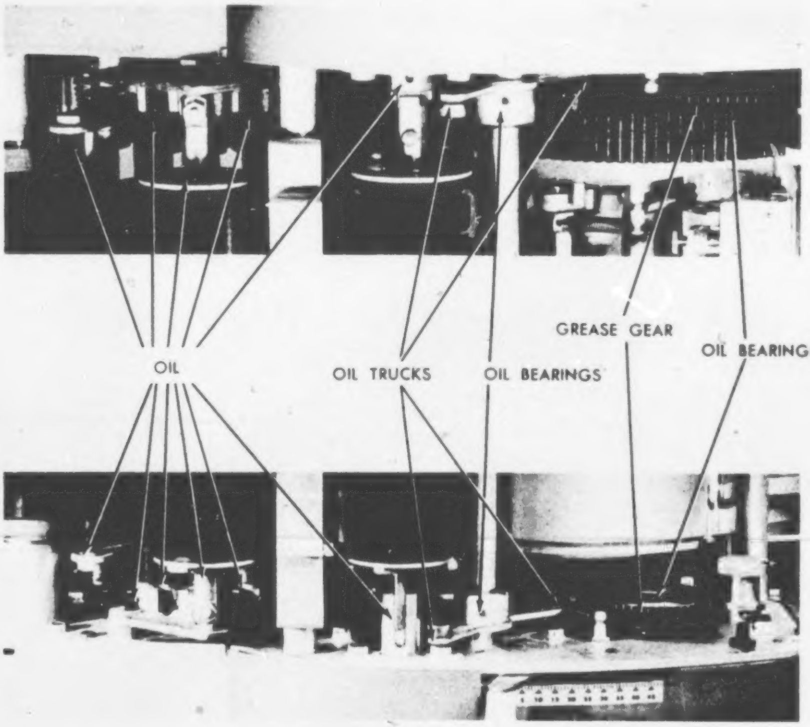
There are many different kinds of CHEMICALS used in the Print Shop. It is very important to use the correct one at the right time. If you are not sure at any time, ask someone in charge. Learn to recognize the colors and read the labels.

ASSIGNMENT:

You will have to show that you understand all of these things by the way you do the work.

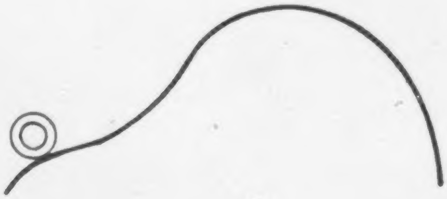
LESSON 12 – LUBRICATION (OILING THE PRESS)

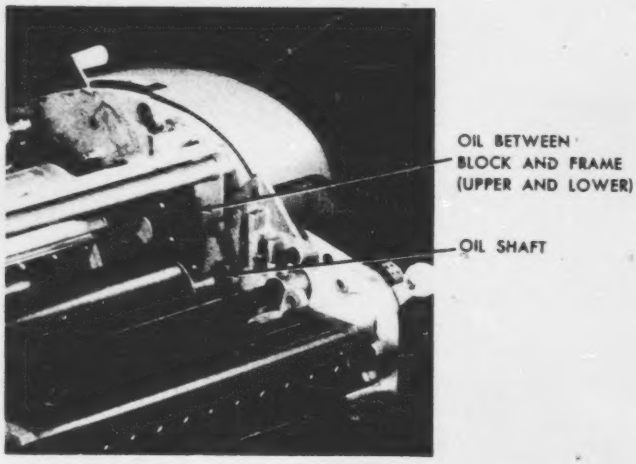
All moving parts need oil. Look for the oil holes in the ends of the roller shafts. Just a drop is all you need. More than that just runs down the sides of the press and does no good.



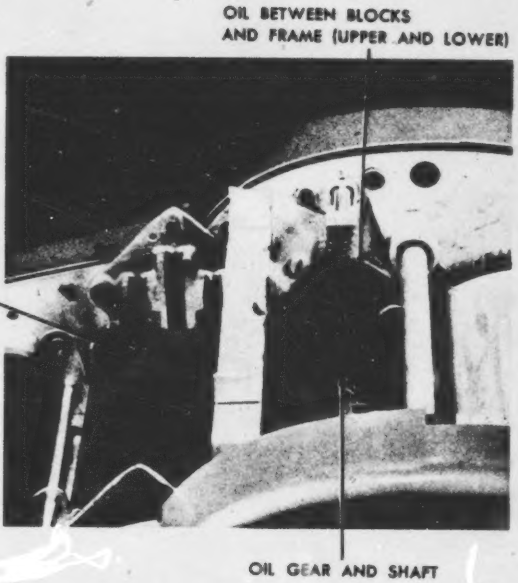
Remove: AQUAMATIC OSCILLATING ROLLER, INK OSCILLATING ROLLER, TWO SMALL "RIDER" ROLLERS, INK DUCTOR ROLLER. Be careful when you lay these rollers down. Don't let them roll off on the floor. This will damage the ends.

There are several small rollers, or wheels, that follow the CAMS. They are called TRUCKS. They must be oiled every time you oil the press. These CAMS and TRUCKS are like clocks, or timers. They tell the press when to do things, like when to pick up a sheet of paper.

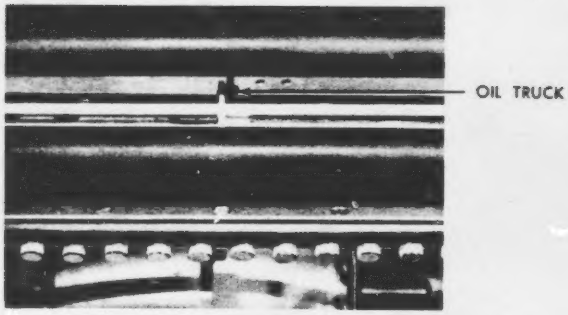




OIL BETWEEN BLOCK AND FRAME (UPPER AND LOWER)
OIL SHAFT



OIL BETWEEN BLOCKS AND FRAME (UPPER AND LOWER)
OIL GEAR AND BEARING
OIL GEAR AND SHAFT



Open the door on the side of the press. Inside you will see two pumps. One is for the VACUUM and the other is for the AIR. They each have two glass jars attached. The larger jars should be kept empty and the felt washers inside clean.

The two smaller jars should be full of fine pump oil. You will see a soft wick sticking down inside the jar. This wick should always be soaked with oil. This is how the pumps get their oil supply.

This complete oiling should be done every 36 hours of running time.

Every day you should oil the two oscillating rollers and the blocks that operate the two form rollers.

Don't forget the small TRUCK under the INK DUCTOR ROLLER. If these TRUCKS get dry and stop turning, they will just slide around the cam and wear it out.

The gears should be covered with a thin film of grease. Again, be careful. If you get too much grease on the gears, the grease will spread all over the press and make trouble for you later.

While you have the rollers out of the press to oil it, check and see if there is any old paper trapped in the teeth of the gears. Gear teeth, like your teeth, should be clean.

ASSIGNMENT: Mark True or False:

__________A complete oiling must be done every day.

__________The gears should be covered with a thin film of grease.

UNIT VIII

BINDERY – FINISHING

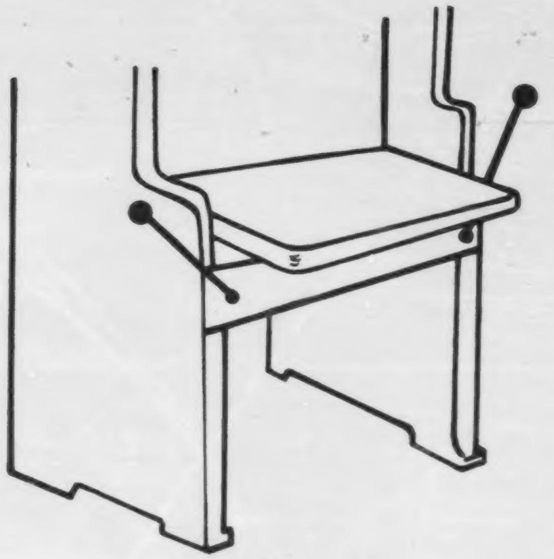
LESSON 1 – CUTTING WITH THE POWER PAPER CUTTER

At the end of this lesson you will know the safe way to use the paper cutter. You will cut the step-and-repeat job you have finished printing.

The first thing to learn about the paper cutter is RESPECT. You must be EXTRA CAREFUL around this machine.

Safety rule #1 is: Only ONE person at a time works on the cutter.

Safety rule #2 is: ONLY PAPER is to be cut on this machine. If you leave a metal scale or anything else on the table, and the blade comes down, the scale is finished. SO IS THE BLADE.

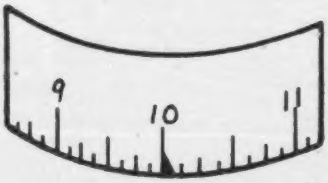


This cutter has two operating controls — one for each hand. This is a safety device that is built into the machine. As long as only one person is working the machine, and as long as that person has only two hands, he/she is not going to get hurt. The blade is razor sharp.

There are three main parts: the BACK FENCE, THE CLAMP, and the BLADE.

SETTING THE FENCE

The BACK FENCE is operated by the HANDWHEEL in the front, under the table. This handwheel moves the fence forward or back. In the center of the cutter and up about eye level you will see a curved steel scale, marked off in inches.



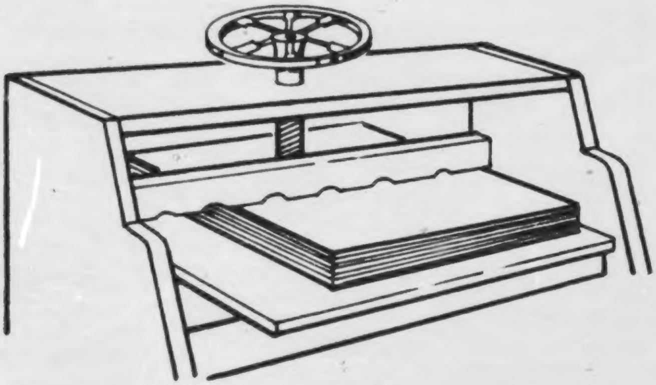
If you wish to cut some paper 10" long, turn the handwheel until the number 10 appears in the center of the viewer. At the bottom you will see a red triangle. Line this up with the mark for 10". This means that there are 10 inches between the fence and the blade. On the shaft of the handwheel there is a wing nut. This is a lock to keep the fence from moving as you make your cuts. Make sure you tighten it every time you change the setting.

Jog the paper so that all the sheets are squared up and even. Slide the paper against the side of the cutter and the fence at the same time. The paper must be tight against these two surfaces to get an accurate cut.

ASSIGNMENT:

Set BACK FENCE for 16", 21", 5 1/2", 6 3/4", 8 1/2"

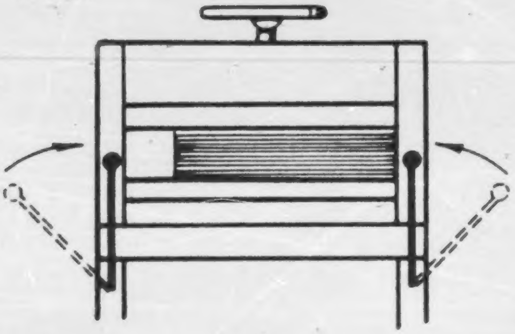
OPERATING THE CLAMP



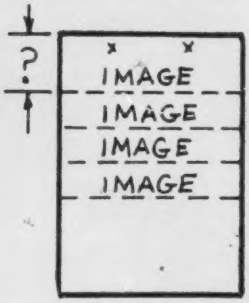
The CLAMP holds the paper tight where you have just placed it. The clamp is operated by turning the large handwheel on top of the cutter. The paper must be held down tightly when you cut or you will not get an accurate cut. The paper will slide all around. Turn the wheel until it hits the paper. Now, turn the wheel hard, and you are ready to make your cut. Check to see if the setting has moved.

OPERATING THE BLADE

Start the cutter by pushing the switch on the left side of the cutter.



The BLADE is operated by the two handles on either side of the cutter. Can you guess why there are TWO handles? RIGHT! One for each hand. The blade will not move if you move only one handle. This is the built-in safety feature we talked about before. Now, take hold of the two handles and move them toward the center of the cutter. Hold them there until the blade has moved down, cut the paper, and moved back up again. Then move handles out to the original position. Turn the handwheel to the left, and you can take the paper out. Just remember to keep your hands OUT FROM UNDER THE CLAMP when you are tightening the clamp on the paper. The paper cutter is used first to cut stock for the press. After a job has been printed, it is used to trim the sheet to size.



Remember the step-and-repeat lesson you stripped and plated? Well, after printing it must be cut apart. Take one sheet to the line-up table and draw lines where the sheet must be cut. Measure from the gripper edge to the first cut, set the back fence, jog the paper, put it in cutter, and CLAMP DOWN.

The cutter can cut up to one ream (remember how many sheets are in a ream?) at a time, so don't waste time cutting any less.

Draw a pencil line on the top sheet by following the clamp. This will show you where the cut is going to be made. Release the clamp and check the sheet. Are you sure this is where you want the first cut to be? Much time and material is saved by checking this way. If the line goes through the printing, the job will have to be thrown away and done over again. Time and materials are very EXPENSIVE, and you have no right to waste them by being careless.

If the pencil line shows that your setting was OK, then go ahead and make your cuts.

ASSIGNMENT: Fill in the blanks:

There are _____sheets in a ream.

The __________ is the part of the cutter that holds the paper tight.

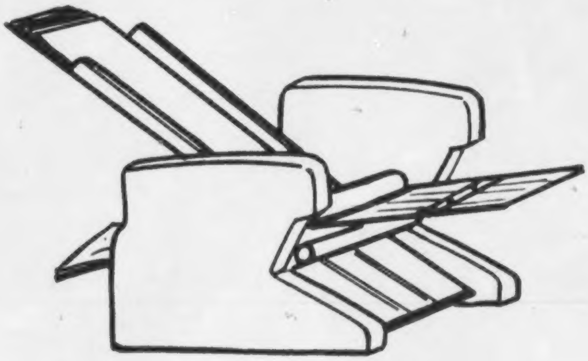
You must use __________ hands to operate the blade.

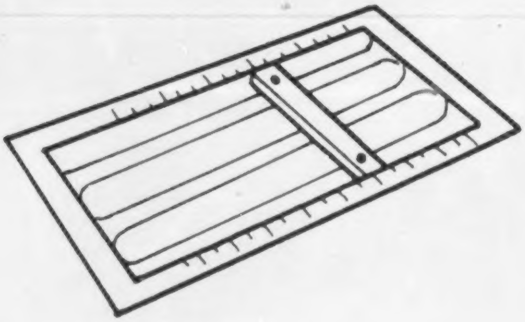
LESSON 2 – FOLDING WITH THE FOLDING MACHINE

When you have finished this lesson, you will fold several of your printed pieces on the folder.

Any machine with moving parts can hurt you. The FOLDING MACHINE is no exception. Keep your fingers out of the rollers while the machine is running. If paper jams up – STOP THE MACHINE!

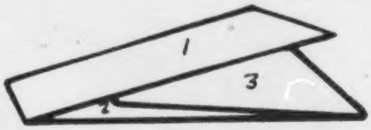
This machine is used when sheets must be folded, as for a small booklet. It can be used for letters that must be put into envelopes. The machine does the job much faster and more accurately than doing it by hand.

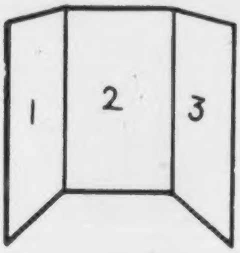




Paper is fed into rollers that carry it to the plates. These plates have movable guides and a scale along each side of the plate.

Let's fold a letterhead to fit into an envelope. First, fold the sheet so it is evenly divided by three even folds. Now measure two of those folds. Set the guide on the top plate for this measurement. Measure the third panel. Set the guide on the lower plate for this measurement.

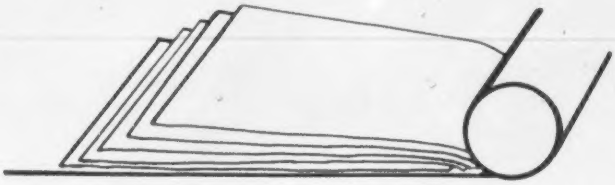




Set DEFLECTOR LEVER to OFF. This allows the sheet to go into the lower plate. (If we were going to make only one fold, the lever would be moved to ON.) Feed one sheet through the machine. Check this sheet with the one you folded by hand. If not just right, move the guides until you have a sheet that looks like the hand-folded sheet.

Load about 1/3 of a ream of sheets in the feeder. This feeder is different from the feeder on the press. This uses no air or vacuum. There is a rubber wheel that picks off the top sheet and feeds it into the the rollers.

The sheets must first be fanned out, as in the drawing at the right, so the rubber wheel will pick up only one sheet at a time. Fanning the sheets also helps separate them so the sheets will not stick together as they are fed into the folder.



Turn machine off when making adjustments. Keep fingers away from rollers when machine is running.

ASSIGNMENT:

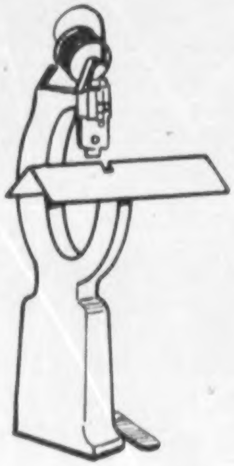
Set folder to fold an 8 1/2" x 11" sheet in half (one fold).

Set folder to fold an 8" x 10" sheet into three even parts.

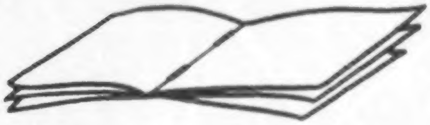
LESSON 3 – STITCHING

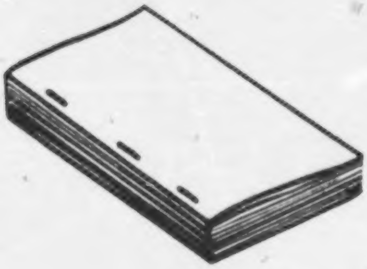
When you have finished this lesson you will assemble and fasten some of your printed sheets.

The WIRE STITCHER is the name of the machine that is used to put stitches in books and magazines to hold them together. A spool of thin wire is placed on a spindle on top of the machine and is fed through the machine, which automatically cuts the wire to the right length. The wire is then driven through the paper. The ends are bent under to make the staple. If you aren't careful, you'll stitch your fingers to the paper!



There are two kinds of stitches that we use. The most common is the SADDLE STITCH. This is used on most of the magazines you read. It is used on the Jersey School News. This stitch allows the magazine to be opened flat. This makes it easy to read. In magazines that use a lot of pictures, it allows the picture to print into the center, or gutter area.





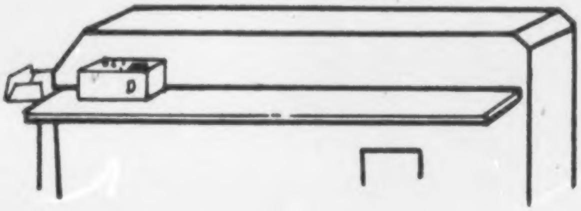
The other kind of stitch is the BACK STITCH. This is used mostly to stitch a lot of single sheets together, as in a report. An in-plant shop will get many jobs like this. Any number of pages can be stitched.

For the saddle-stitched book a dummy must be made so that the pages will be in order.

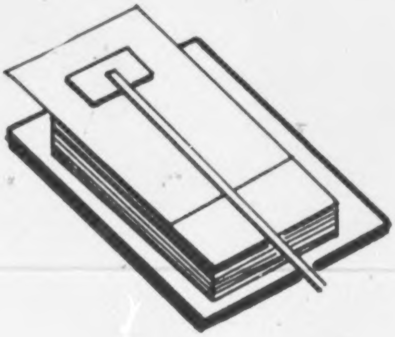
LESSON 4 – COLLATING

When you have finished this lesson you will collate some of the printed material you have produced.

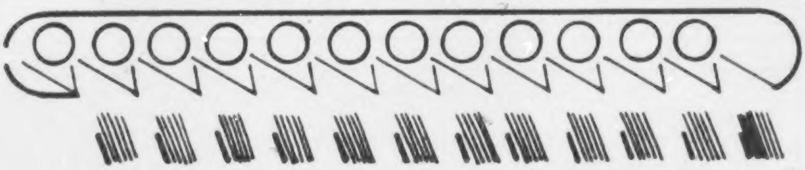
Don't be afraid of this word – it just means putting a lot of sheets or pages together, in their proper order. There is a machine that makes this boring job easy and fast.



This machine is called an AUTOMATIC COLLATOR. It has 12 bins for holding the pages. These bins hold about 200 sheets each. The sheets stand on end and are raised, one at a time, by metal arms with rubber pads that rest on the sheets. The sheets are arranged in the collator with the last sheet in the first bin, the next to last in the next bin, and so on until you come to the first sheet. It makes it easier to separate the books or reports if one bin, either the first or the last, has a colored page in it.



The machine is in two parts. The lower part is where the bins are. The upper part is hinged at the back. The machine must be opened to load the bins. The top part has many rollers, and two endless tapes.



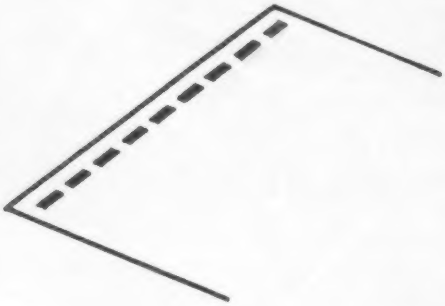
These rollers and tapes move the sheets to the left, and out of the machine into a receiving tray. If you loaded it right, the first page will be on the top. The metal arms with the rubber pads raise the sheets and feed them into the rollers and tapes.

LESSON 5 – PLASTIC BINDING PUNCH AND ASSEMBLER

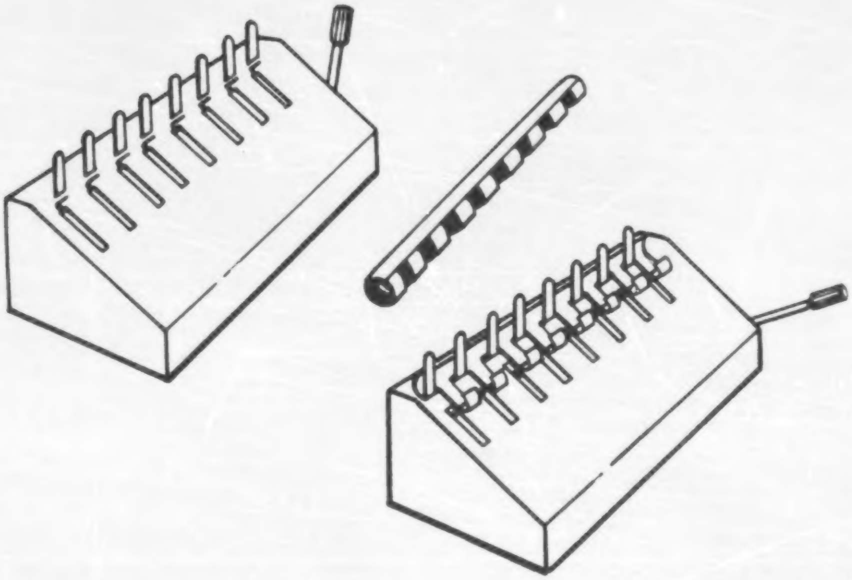
At the end of this lesson you will fasten sheets together with plastic binding.

Plastic binding gives us another way of fastening loose sheets together.

The sheets are first punched on the punch machine. This punches a row of holes for the plastic material to go through. The sheets look like this when they are punched. Before you start on a good sheet, take a piece of scrap paper the same size as the printed sheet. Punch it and see if the holes are properly placed on the sheet. Move the guide at the left of the machine until the first and last holes are the same distance from the edges of the paper. The machine will take only about 20 sheets at a time.



After the holes are punched, the booklet is ready to be bound. This is done on a hand-operated machine with "fingers" sticking up that the plastic binder fits over. The plastic comes rolled up, with small tabs that are unrolled by more small fingers. The holes in the paper are placed over these tabs, and the plastic is allowed to roll up again. The finished book is then lifted off the long fingers and put aside, and the next book is started in the same way. Books bound this way are easy



to open and easy to read because they open flat. They can be taken apart to change a page or add a page. This kind of binding is more expensive than wire stitching, and takes more time and work.

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